

Criteria | Insurance | General:

Insurer Risk-Based Capital Adequacy--Methodology And Assumptions

November 15, 2023

(Editor's Note: On Jan. 22, 2025, we republished this criteria article to make nonmaterial changes. See the "Revisions And Updates" section for details.)

OVERVIEW AND SCOPE

These criteria provide S&P Global Ratings' methodology and assumptions for analyzing the risk-based capital (RBC) adequacy of insurers and reinsurers. We apply the output from these criteria in our insurance framework (see our insurers rating methodology in "Related Criteria") to assess capital and earnings--a key rating factor for insurers.

These criteria apply globally to all insurers in the life, property/casualty, health, mortgage, trade credit, and title insurance and reinsurance sectors. We apply the bond insurance capital adequacy criteria (see "Related Criteria") to assess the risk-based capital adequacy of bond insurers.

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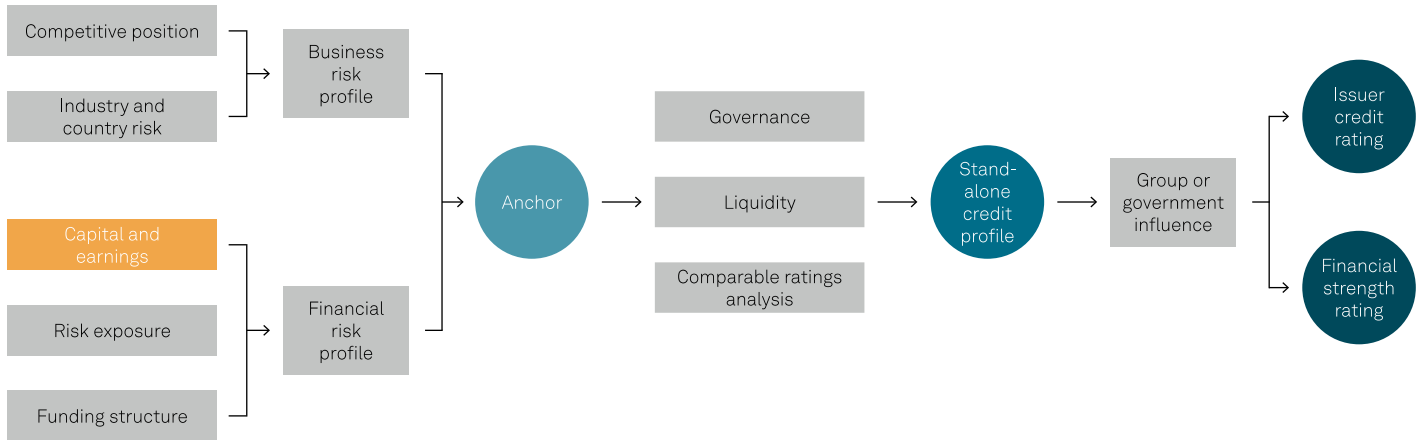
METHODOLOGY

SECTION 1: STRUCTURE OF THE METHODOLOGY

The methodology describes the framework for assessing the capital adequacy of insurers and reinsurers. The output from these criteria is the starting point to assess capital and earnings in our insurance ratings framework (see chart 1). The glossary contains definitions of terms we use in these criteria.

Chart 1

Insurance ratings framework

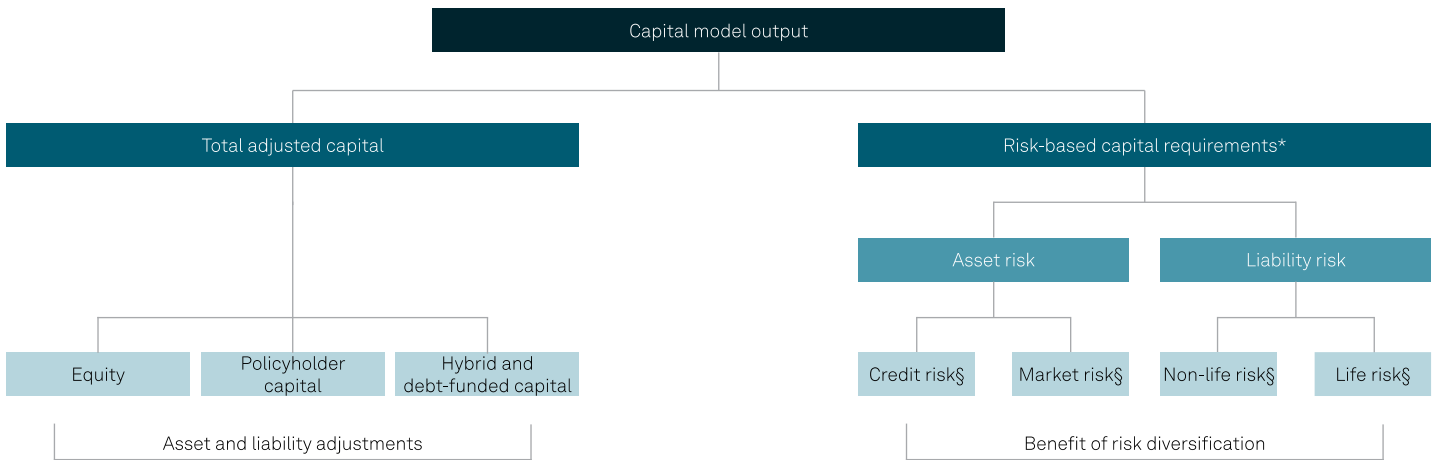


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In our capital analysis, we compare our measure of capital, total adjusted capital (TAC), with our measure of RBC requirements at different stress levels, based on an insurer's risks (see chart 2).

Chart 2

Capital model output



*The different stress levels we use for individual risks are 99.5%, 99.8%, 99.95%, and 99.99%.

§Subject to any applicable company-specific adjustments.

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RBC requirements are the amounts of capital in excess of reserves that an insurance company may need to cover losses from different risks in stress scenarios. The stress scenarios we typically apply to calibrate RBC requirements for individual risks are:

- 99.5% (moderate stress);
- 99.8% (substantial stress);

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- 99.95% (severe stress); and
- 99.99% (extreme stress).

The calibration of the RBC requirements represents the potential volatility in risk drivers over a one-year period, measured using a value-at-risk (VaR) approach. We base the calibration on observed volatility, generally using data for periods of up to 30 years--depending on the risk--supplemented by scenario-based analysis and analytical judgment where appropriate. We also use scaling factors relative to a 99.5% confidence level to calibrate risk charges at higher confidence levels--for example, where there is a limited time series of data.

The total RBC requirement is the sum of the capital requirements for each risk less an explicit credit for risk diversification. This explicit diversification is in addition to implicit diversification that is embedded in many of the individual charges that were calibrated with indices and industry-level data. The explicit diversification credit brings the sum of the capital requirements across each risk to a level commensurate with the defined stress scenarios.

Financial Statements

For companies or groups producing financial statements in accordance with International Financial Reporting Standards (IFRS) or generally accepted accounting principles (GAAP), we typically calculate TAC and use exposures from information contained in those statements.

However, in certain countries, some companies produce financial statements only in accordance with the local regulatory basis (statutory basis) of accounting. We may calculate TAC and use exposures from information contained in these regulatory financial statements if there are no IFRS or GAAP financial statements or if the regulatory financial statements provide information that we believe is more relevant to our capital analysis.

We may also use information from other sources, such as survey information from issuers, to supplement information in reported financial statements.

SECTION 2: TOTAL ADJUSTED CAPITAL

TAC is the measure we use to define the capital available to meet a company's capital requirements. We calculate TAC using a globally consistent methodology. To determine TAC, we adjust common shareholders' equity (or policyholders' surplus, such as for mutual companies) for differences in valuation assumptions for assets and liabilities, including for different accounting standards (see table 1). We believe TAC is a more economic view of the capital that is available to absorb losses than reported equity (or surplus).

Table 1

Components Of Total Adjusted Capital

Common shareholders' equity/policyholders' surplus

Plus	Equity noncontrolling interests
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Table 1

Components Of Total Adjusted Capital (cont.)

Minus	Investments in own shares/treasury shares
Minus	Shareholder distributions not accrued
Minus	Intangible assets
Plus/minus	Postretirement employee benefits
Plus/minus	Unrealized gains and losses on investments
Plus/minus	Non-life reserve adjustments
Plus/minus	Life reserve adjustments
Plus/minus	Company-specific analytical adjustments to determine ACE
= Adjusted common equity (ACE)	
Plus	Hybrid capital/debt-funded capital (subject to tolerance limits)
Minus	Investments in noninsurance subsidiaries and unconsolidated insurance subsidiaries
Plus	Policyholder capital available to absorb losses
Plus	Unrealized gains on investments backing participating life business
Plus/minus	Company-specific analytical adjustments to determine TAC
= Total adjusted capital (TAC)	

Adjustments to common shareholders' equity are net of the related tax impact, unless otherwise stated.

Adjusted common equity (ACE) offers a narrow definition of the group's capital resources because it excludes items such as hybrid capital instruments, eligible debt-funded capital, and policyholder capital. These items may, however, be included in TAC. TAC represents the capital that is available to absorb losses in the insurance business, which is why we typically exclude the capital invested in noninsurance businesses from TAC.

Routine Adjustments To Common Shareholders' Equity To Determine ACE And TAC

Routine adjustments to common shareholders' equity or policyholders' surplus are made where applicable. Adjustments to determine ACE and TAC are net of the related tax impact. Adjustments for items that are on balance sheet are net of the related on-balance-sheet deferred tax asset or liability. We apply tax-effect adjustments for items that are off balance sheet. Where the tax effect is not disclosed or is otherwise unavailable, we use the effective tax rate. We may adjust the value of on-balance-sheet deferred tax assets that relate to other items where asset recoverability is questionable or distant.

Common shareholders' equity

Common shareholders' equity (or regulatory surplus where we use the regulatory financial statements) is the starting point for determining ACE and TAC. For mutual companies, we may use policyholders' surplus or net assets. Common shareholders' equity excludes any minority interests, preferred stock, or hybrid securities that are included in total equity. Where we use regulatory surplus, we also exclude items that do not relate to common shareholders' equity, such

as the policyholder dividend liability.

For group capital models that are not based on consolidated financial statements (for example, if the financial statements do not include the group parent):

- We deduct from common shareholders' equity the total amount of hybrid equity and debt-funded capital that is funding the capital of the insurance entities (see the section on hybrid capital and debt-funded capital);
- We typically deduct intragroup transactions from common shareholders' equity (for example, a loan from a subsidiary to its parent in lieu of a dividend); and
- We include adjustments for other entities, such as the group parent, to ensure our capital analysis fully captures the resources and risks of the consolidated group.

Equity noncontrolling interests

ACE includes the holdings of certain minority investors in consolidated group entities (also called equity minority interests). We add them to shareholders' equity because they constitute capital controlled by the group that is available to absorb losses. However, there are some noncontrolling interests that we do not include in equity noncontrolling interests, such as minority interests in special-purpose entities that are not operating subsidiaries or those relating to consolidated property companies or funds. If equity noncontrolling interests are negative, we deduct this amount from shareholders' equity.

Investments in own shares or treasury shares

If an insurer reports treasury shares (or has investment in its own shares) as assets, we deduct this figure from shareholders' equity to determine ACE to produce a consistent measure of the resources available to absorb losses.

Shareholder distributions not accrued

We deduct from shareholders' equity the expected dividend relating to the most recent financial year that is not accrued on the balance sheet (including any expected distributions on other capital instruments included in equity). This deduction recognizes capital expected to be paid out.

If an entity has not formally announced a dividend or if that information is otherwise unavailable, we deduct our estimate, based on factors such as the company's stated dividend policy or historical payouts. We also deduct dividends that will be paid in the form of ordinary shares unless there is a clear strategy not to eliminate the dilutive effect.

If a company has withdrawn its proposed dividend (in effect canceling the proposed dividend), we do not deduct this amount from shareholders' equity. But if a dividend has been proposed and then deferred, we deduct this amount if we expect payment will be made within a year. Otherwise, we capture the deferred payment in our forecasts.

Intangible assets

We deduct goodwill and other intangible assets from shareholders' equity to determine ACE. This recognizes that these assets are unlikely to be realizable during stress (e.g., they may be integral

to the ongoing operations of the business) and ensures consistency between companies that have grown organically and those that have grown through acquisitions.

We do not adjust equity for negative goodwill. We typically treat intangibles related to nonaffiliated equity investments as assets exposed to equity market risk and do not deduct such intangibles from shareholders' equity.

Postretirement employee benefits

To determine ACE, we deduct from equity any deficits in defined-benefit employee pension (or long-term health care) schemes that are held off balance sheet.

We also deduct from equity on-balance-sheet surpluses related to defined-benefit employee pension (or long-term health care) schemes to determine ACE, unless we believe the surplus is fungible (i.e., not ring-fenced) and sustainable. We add off-balance-sheet surpluses if we believe they are fungible and sustainable.

Unrealized gains and losses on investments

We add to shareholders' equity unrealized investment gains (or deduct unrealized investment losses) that are not included in reported equity (or surplus). This adjustment ensures we capture the full market or fair value of investments in ACE and to align the valuation with the exposures we use to determine capital requirements.

We may adjust the value of assets if we have doubts about the valuation of certain investments or asset classes. For example, for property investments, we may consider factors such as the frequency of conducting property valuations, whether the valuation is conducted by independent parties, and whether the property is income producing. We are more likely to haircut the value if it relates to development property or land that is not yet income generating.

For life insurers, we may exclude from ACE the unrealized gains and losses on fixed-income assets if all or a meaningful portion of the life liabilities are valued at fixed discount rates and we do not have sufficient information to determine or estimate their value based on nonfixed discount curves (see the section on the life reserve valuation adjustment).

Associates and joint ventures: To calculate ACE, we include the difference between the market value and book value of the group's shareholdings in listed associates and joint ventures that we determine the group does not control (we apply our group rating methodology to determine control; see "Related Criteria"). To determine capital requirements, we apply the relevant asset risk charge to the exposure (e.g., for listed equity investments, we apply the relevant listed equity charge to the market value of the group's shareholdings of such entities).

Non-life reserve adjustments

Non-life reserve surpluses and deficits: Where we determine that a company's reserves are either deficient or in surplus compared with our view of the best estimate (for example, by our own reserve analysis, external actuarial review, or explicit margins required by regulation), we include an adjustment for the surplus or deficit in ACE. We deduct from shareholders' equity the amount of any reserve deficiency and add to shareholders' equity the amount of any reserve surplus.

Other equity-like non-life reserves: We include in ACE other equity-like reserves that we determine are available to absorb future unexpected non-life losses (see glossary for examples). We include these reserves net of any associated on-balance-sheet tax impact (e.g., a related deferred tax asset) or tax-adjust them otherwise. We do not typically tax-adjust equity-like reserves that are tax deductible. If the financial statements that are the primary basis for determining ACE do not allow these reserves under the relevant accounting standards, but they are held under the relevant local accounting standards used for tax purposes, we also include in ACE the related deferred tax liability on equity-like reserves that are tax deductible.

Non-life reserve discounting: To determine ACE, we typically adjust non-life technical reserves for the impact of discounting when an insurer reports a material proportion of its reserves on an undiscounted basis. We usually do not adjust non-life technical reserves when they are already discounted, nor when undiscounted reserves are expected to settle on average within one year. Where we adjust non-life technical reserves for the impact of discounting, we calculate the adjustment as follows:

$$\text{Non-life technical reserves (net of reinsurance)} * (1 - \text{tax rate}) * \left(1 - \left(\frac{1}{(1+r)^n}\right)\right)$$

r= applicable long-term government bond yield, which may be negative

We typically use the yield to maturity on a government bond of a term that is the closest available to the mean term of the technical reserves. The applicable government bond yield is the one that we believe is most relevant given the currency of the technical reserves (this is not necessarily the reporting currency). Where it is material to our analysis, we may apply a weighted average government bond yield for technical reserves denominated in different currencies.

n = mean term of technical reserves in years

Non-life technical reserves are undiscounted reserves net of reinsurers' share of technical reserves and after any adjustment that we make for reserve surpluses and deficits and excluding other equitylike non-life reserves. It includes both outstanding claims and premium provisions (for example, unearned premium reserve) and is net of non-life deferred acquisition costs. We also typically deduct premium receivables.

Life reserve adjustments

Life reserve valuation adjustment: When there is a mismatch between the valuations of assets and liabilities, we apply an adjustment to the life reserves to determine ACE. This usually occurs when we have included in ACE the unrealized gains and losses on fixed-income assets and when some or all of the life liabilities are valued at fixed discount rates (i.e., they are not sensitive to current market interest rates).

When it is applicable, we include as an adjustment the difference between the reported life liabilities valued using nonfixed discount curves (i.e., reflecting current interest rates) and the reported life liabilities (we deduct the difference from equity, and the adjustment can be positive or negative). In the absence of credible information on the reported life liabilities valued using nonfixed discount curves, we typically use the unrealized gains or losses on bonds and derivatives backing life liabilities to adjust the value of reported life liabilities. Where we do so, we may adjust the value of unrealized gains or losses that we use for the valuation adjustment in situations such

as:

- If there is a material mismatch between the duration of assets and liabilities: For example, we may increase liabilities by more than the unrealized gains on bonds if the duration of assets is materially less than the duration of liabilities. Similarly, we may reduce liabilities by less than the unrealized losses on bonds if the duration of assets is materially higher than the duration of liabilities.
- If the market value of liabilities is insensitive to credit spread movements: For example, we may exclude the impact of unrealized losses from credit spread widening when adjusting liabilities (i.e., we may not reduce liabilities and therefore not add back these unrealized losses to determine ACE).

Where we have excluded from ACE the unrealized gains and losses on fixed-income assets backing life liabilities, we may also apply an adjustment to the value of life liabilities (if any) that are based on nonfixed discount curves, to be consistent with the valuation bases for the rest of the liabilities and the fixed-income assets.

We also include in the life reserve valuation adjustment the unrealized gains and losses on all investments backing participating policyholders' liabilities when we include them in the adjustment for unrealized gains and losses to determine ACE.

Other equity-like life reserves: We include in ACE other equity-like life reserves that we determine are available to absorb future unexpected life losses (see glossary for examples). We include these reserves when they are explicitly identified as reserve items in excess of best-estimate reserves in the reported financial statements that we use for our capital analysis. These explicit reserves are typically required to be established under the relevant regulatory rules or accounting standards.

When they are not explicitly identified, we may use information that is reported under different reporting standards (e.g., regulatory solvency statements) to determine the excess over the best estimate, but only to the extent that the excess does not result from future profits related to future fees or investment income, but rather from conservatism in other assumptions (e.g., mortality assumptions).

We include these reserves net of any associated on-balance-sheet tax impact (e.g., related deferred tax assets) or tax-adjust them otherwise. We do not typically tax-adjust equity-like reserves that are tax deductible. If the financial statements that are the primary basis for determining ACE do not allow these reserves under the relevant accounting standards but they are held under the relevant local accounting standards used for tax purposes, we also include in ACE the related deferred tax liability on equity-like reserves that are tax deductible.

Off-balance-sheet value of in-force life business: Where we determine there are material differences between the reported life reserves (after any life reserve valuation adjustment and excluding both other equity-like life reserves and on-balance-sheet life value-in-force) and their economic value (such as a best estimate), we will include in ACE up to 100% of the difference between the economic value and reported value (as adjusted).

We do not include an adjustment for off-balance-sheet life value-in-force (VIF) where we determine the financial statements are on an economic value basis. To make this assessment, we generally use information that is subject to an independent third-party review (such as by an auditor, regulator, or actuarial consultancy). The adjustment for VIF can be positive or negative. For example, we will assess VIF as negative if the reported reserves (as adjusted) are below the

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economic value. The adjustment for VIF can reflect values that are shown in other reports (e.g., using values from a supplementary embedded value report or regulatory statements). Where necessary, we make an adjustment to avoid any double counting of VIF. We view reported assets such as life DAC or life value of business acquired (VOBA) as on-balance-sheet life VIF.

We may include less than 100% of VIF when, for example, we determine the methodology or assumptions used to calculate VIF are aggressive, or where the information we use to determine VIF is not subject to an independent third-party review. For example, we may consider the methodology and assumptions aggressive when they are not based on market-consistent principles or where the insurer has a history of adverse experience relative to its assumptions.

Hybrid capital and debt-funded capital

We include in TAC S&P Global Ratings-eligible hybrid capital instruments and debt-funded capital, subject to our tolerance limits (see table 2). Eligible hybrid capital instruments are high- and intermediate-equity-content hybrid capital instruments. We determine the equity content of hybrid capital instruments by applying our hybrid capital criteria (see "Related Criteria"). Eligible hybrid capital instruments may include hybrid instruments issued by a nonoperating holding company (NOHC), insurance operating entities (we explain in our hybrid capital criteria when we include operating company hybrids in our group analysis), or related financing entities.

We do not include in TAC any high- or intermediate-equity-content hybrids issued by noninsurance operating subsidiaries (or by any intermediate holding company of the noninsurance subgroup). This is because TAC represents capital available to absorb insurance losses.

Debt instruments that are issued by an NOHC (or a financing subsidiary of an NOHC) are eligible as debt-funded capital where, in addition to all the conditions in the following paragraph being met, either:

- There is high structural subordination of creditors of the NOHC relative to senior creditors of the regulated operating entities (we consider structural subordination high when potential regulatory restrictions to payment are high between regulated operating entities and the NOHC--typically this is when the NOHC is outside the regulatory perimeter); or
- If there is low structural subordination of creditors of the NOHC relative to senior creditors of the regulated operating entities, the NOHC debt instrument is available and able to absorb losses through coupon deferral or cancellation or through principal deferral, write-down, or conversion without causing an event of default.

Debt instruments are eligible as debt-funded capital only where all the following conditions are met:

- The regulator allows NOHC debt to fund operating company capital (we exclude amounts that exceed any regulatory tolerance limits);
- If the NOHC is inside the regulatory perimeter, the debt instrument is included as regulatory capital in group solvency calculations (we exclude any portion of the instrument that is not included as regulatory capital);
- The residual time until the effective maturity exceeds one year (we apply the definition of effective maturity from our hybrid capital criteria);
- The NOHC directly or indirectly owns the regulated operating entities and is not owned directly or indirectly by regulated insurance operating entities (and any financing subsidiary is not owned directly or indirectly by regulated insurance operating entities);

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- None of the NOHC's (or financing subsidiary of the NOHC's) financial obligations are guaranteed by regulated operating entities;
- In our view, the proceeds from the debt instrument are available to the regulated operating entities to absorb losses on a going-concern basis (for example, debt raised to fund nonregulated activities or debt that we define as operational leverage is not eligible as debt-funded capital); and
- The debt instrument is not an eligible intermediate- or high-equity-content hybrid capital instrument.

We add S&P Global Ratings-eligible hybrid capital and debt-funded capital to ACE to determine TAC, subject to the tolerance limits listed in table 2. For capital models not based on consolidated financial statements, we may calculate ACE using consolidated GAAP or IFRS financial statements solely for the purpose of determining the hybrid capital and debt-funded capital tolerance limits.

Table 2

Hybrid Capital And Debt-Funded Capital Tolerance Limits

Category	Maximum tolerance
High-equity-content hybrids	Up to 40% of capital
Intermediate-equity-content hybrids	Up to 30% of capital*
No-equity-content hybrids	0% of capital§
Debt-funded capital	Up to 20% of capital*

Notes: Capital is defined as adjusted common equity (ACE) + high-equity-content hybrids + intermediate-equity-content hybrids + debt-funded capital. To determine the maximum tolerance, we use the higher of capital or 0. *The limit for debt-funded capital is reduced by the higher of i) the amount of eligible intermediate-equity-content hybrids in excess of 10% of capital, and ii) the amount of eligible hybrids (intermediate and high) in excess of 20% of capital. For example, if eligible intermediate-equity-content hybrids total 22% of capital and eligible high-equity-content hybrids total 11% of capital, the tolerance limit for debt-funded capital is reduced to 7% (20% - 13%), 13% being the higher of i) the amount of intermediate-equity-content hybrids in excess of 10% of capital (22% - 10% = 12%), and ii) the amount of hybrids in excess of 20% of capital (22% + 11% - 20% = 13%). The limit for intermediate-equity-content hybrids is reduced by the amount of eligible high-equity-content hybrids in excess of 10% of capital. For example, if eligible high-equity-content hybrids total 15% of capital, the tolerance limit for intermediate-equity-content hybrids is reduced to 25% of capital (30% - 5%), 5% being the amount of high-equity-content hybrids in excess of 10% of capital (15% - 10%). This ensures the total amount of hybrid capital and debt-funded capital in total adjusted capital is not more than 40% of total capital. §Unless eligible as debt-funded capital.

A key factor in including the proceeds from NOHC debt issuances in TAC is our view that these resources are available to absorb losses in regulated operating entities. Cash and investments retained on the balance sheet of an NOHC indicate that the group's capital resources are not fully deployed in regulated operating entities. Where there is high structural subordination, we apply a 20% haircut to the value of these NOHC assets to determine the amount to include in our calculation of TAC.

We may apply a higher haircut if we have heightened doubts about the availability of the group's capital resources to absorb losses in operating entities--for example, we may apply a 50% haircut when the group stand-alone credit profile is 'bb+' or lower.

We may also adjust the value of NOHC assets that are subject to the haircut--for example, to exclude NOHC assets that i) are being held to pay an external dividend that we have already deducted from shareholders' equity, or ii) relate to debt that is not eligible as debt-funded capital. We limit the total value of the haircut to the amount of eligible debt-funded capital included in TAC, but only to the extent the debt-funded capital relates to debt issued by an NOHC where there is high structural subordination.

Investments in unconsolidated insurance subsidiaries and noninsurance subsidiaries

Unconsolidated insurance subsidiaries and joint ventures: We typically consolidate material unconsolidated insurance entities that we determine are group members (i.e., entities that are controlled by the group). Where the data is otherwise unavailable or the entity is immaterial, we deduct the investment in the unconsolidated insurance entity from ACE to determine TAC. We may adjust for any under- or overcapitalization of the entity.

Noninsurance subsidiaries: We typically deconsolidate material noninsurance operating subsidiaries (and any intermediate holding company of the noninsurance subgroup) from the consolidated financial statements. Therefore, to calculate TAC when deconsolidating, we deduct from ACE the investment in noninsurance subsidiaries and exclude the relevant exposure amounts relating to the noninsurance operating subsidiary from the inputs that we use to determine capital requirements (for example, assets on the balance sheet of the noninsurance subsidiary). We do not deconsolidate or exclude exposure amounts relating to an entity established solely to hold an insurer's investment assets.

The deduction from ACE for investments in noninsurance subsidiaries (and any other entities we deconsolidate) includes capital that is issued by the subsidiary and held by the group parent or other group members, such as common equity, subordinated debt, and other instruments included in regulatory capital. We also deduct any noncontrolling interest in the noninsurance subsidiary.

We do not deduct subordinated debt and other instruments included in regulatory capital that are held by external investors, because these are not included in our measure of ACE or hybrid or debt-funded capital. We may adjust the amount we deduct to account for any additions or deductions that we have made to shareholders' equity (for instance, to avoid double-counting the deduction for goodwill).

The deduction for investments in noninsurance subsidiaries assumes the subsidiary is capitalized to the same level as the group. Where the subsidiary is material, we may adjust up or down the amount we deduct for such entities if we consider the subsidiary significantly weaker or more strongly capitalized, respectively, than the rest of the group. This quantitative adjustment could be informed by one or more of the following:

- A stand-alone capital analysis under the relevant criteria for the subsidiary;
- An analysis of relevant capital metrics, such as regulatory ratios, which may be informed by peer analysis; or
- Our expectation of material capital contributions to, or remittances from, the subsidiary.

If the subsidiary is immaterial, deconsolidation may not be necessary, such that we do not deduct the investment from ACE but apply the relevant capital charges on a fully consolidated basis.

Other affiliates: Where an entity is consolidated in the group's financial statements but we determine the group does not control the entity (i.e., it is not a group member under our group rating methodology), we may treat the entity as an associate in our capital analysis.

Insulated subsidiaries: Where a group member is an insulated subsidiary (including delinked subsidiaries) and we deconsolidate the entity to determine the group credit profile, we apply the methodology for noninsurance subsidiaries to determine TAC.

Policyholder capital

We include policyholder capital in TAC when, in our view, it meets all the following conditions:

- It relates to life insurance (or savings) business;
- It is available to absorb losses across the entity;
- It is not restricted to absorbing losses in a segregated, or ring-fenced, fund (see also the section on capital charges for participating life business in ring-fenced funds); and
- It does not relate to the expected value of future discretionary benefits included in technical provisions.

Policyholder capital that is restricted to absorbing losses in a single legal entity may still be included in TAC for group consolidated capital models if it meets all the above conditions. We capture limitations on the movement of capital resources around groups (so-called fungibility restrictions) in other areas of our insurance ratings framework.

We do not include in policyholder capital the expected value of future discretionary benefits included in technical provisions. This is because we typically capture the ability to reduce future discretionary bonuses and share losses with policyholders (also known as the loss-absorbing capacity of technical provisions) in our interest rate mismatch assumptions or in the capital charges for participating life business in ring-fenced funds.

Policyholder capital could include items such as the unallocated policyholder dividend liability in Japan, the provision pour participation aux excédents (PPE) in France, or freie Rückstellung für Beitragsrückerstattung (free RfB) and terminal bonus in Germany, subject to adjustments for differences in accounting standards. We may also use the value of policyholder capital that is included in regulatory capital, such as 50% of the policyholder dividend liability in the U.S. or surplus funds reported under the Solvency II directive, subject to meeting the conditions above.

We include policyholder capital net of any associated on-balance-sheet tax impact, but we do not otherwise apply tax-effect adjustments.

We exclude from policyholder capital items that are included elsewhere in our measure of capital, such as the present value of expected future shareholder transfers that are included in VIF.

Unrealized gains on investments backing participating life business

To determine TAC, we add to ACE unrealized gains on investments backing participating policyholders' liabilities where we conclude that they i) are available to absorb losses, ii) would not otherwise be recognized in TAC, and iii) do not relate to participating life business in ring-fenced funds. We do not typically add unrealized gains on bonds backing participating policyholders' liabilities because these are not generally available to absorb losses.

Company-Specific Adjustments To ACE And TAC

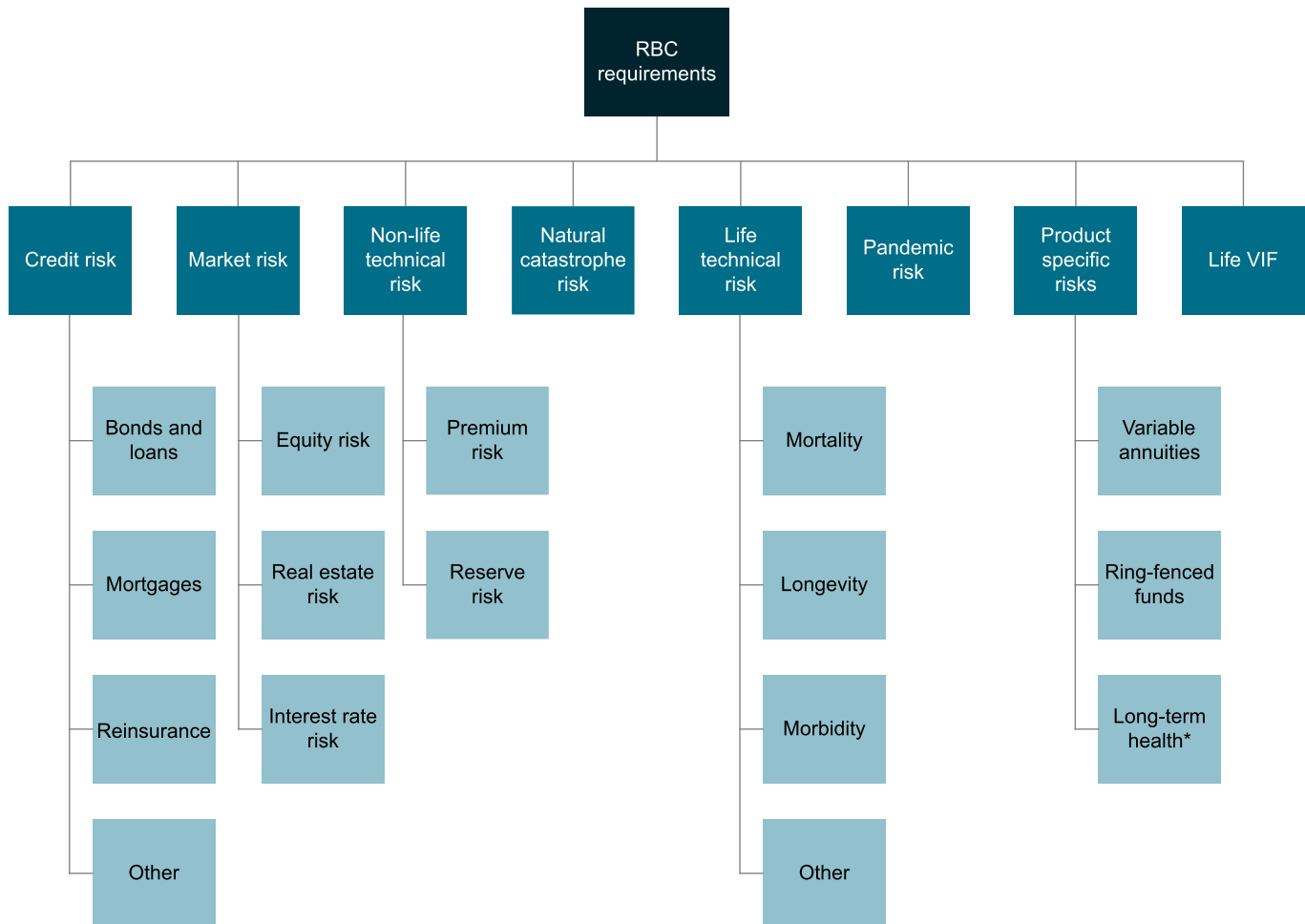
We aim to apply reasonably consistent definitions of ACE and TAC, but specific circumstances or reporting differences may require additional adjustments to common shareholders' equity or policyholders' surplus. Adjustments may apply when, for instance, we assess that some transactions artificially overstate or understate equity. The treatment by regulators and the materiality of the impact may guide the amount we add or deduct when adjusting.

SECTION 3: RISK-BASED CAPITAL REQUIREMENTS

We determine an insurer's RBC requirements based on its exposure to different asset risks and liability risks (see chart 3).

Chart 3

Risk-based capital requirements



*Long-term health business with aging reserves. Source: S&P Global Ratings.
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We typically use the disclosures in reported financial statements as the starting point to determine the nature and risk classification of exposures, such as whether an exposure is an equity, bond, or mortgage loan. In our classification of exposures, we aim to differentiate risks on a globally consistent basis.

However, a sector or specific insurer may have risks that we choose to capture by reclassifying exposures in alternative risk categories. We do this to reflect our expectation of materially and consistently higher or lower losses for that set of exposures than likely would be the case for the typical exposures.

Where we reclassify an exposure, we treat the exposure consistently throughout the criteria. For example, if we reclassify an exposure from a non-life risk to a life risk in our liability risk charges, we include the exposure as a life liability in our interest rate risk charges.

Where an insurer has mitigated risk through use of reinsurance, we typically capture this by

applying charges to the exposure net of reinsurance.

We may make company-specific adjustments to RBC requirements, but only if we consider them material to our analysis and sustainable. Company-specific adjustments are intended to capture specific items, risks, or risk mitigants not explicitly addressed in our criteria, such as hedge programs or certain nonproportional reinsurance transactions (other than those relating to natural catastrophe risk). Company-specific adjustments could also apply to specific risks that are addressed in our criteria when a company's product structures present unique risks that differ from the assumptions underlying the calibration of our risk charges.

Where we make a company-specific adjustment to RBC requirements, it is typically an adjustment to the capital charge or an increase or decrease in the capital requirements for a specific risk. We typically consider a single adjustment material to our analysis if, for example:

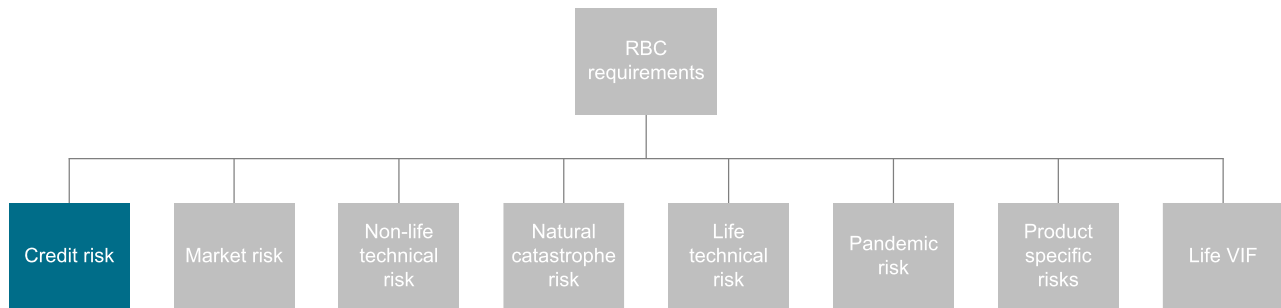
- It could lead to a change in total RBC requirements of more than 5%; or
- We believe the adjustment could result in a change in our capital and earnings assessment.

We may also adjust the relevant exposure measure where we determine that it does not adequately reflect the underlying risk. This could be due to factors such as accounting standards, one-off transactions, or nontraditional product structures. For example, if a one-off contract results in negative reported net written premiums, we may remove this distortion to ensure a positive value for the exposure. In all cases, our measure of exposure is never lower than zero.

We do not apply the sections on credit, market, and life technical risk charges to assets and liabilities that relate to certain ring-fenced life funds or separate account variable annuities when we apply the relevant product specific charges (see the relevant sections). We do, however, apply the sections on credit and market risk (other than interest rate risk) to general account assets backing variable annuity guarantees.

We also do not apply the sections on credit and market risk charges to assets and liabilities relating to unit-linked insurance contracts (also known as nonparticipating investment contracts) other than unit-linked insurance contracts with investment guarantees, where we apply the section on interest rate risk.

Credit Risk



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Credit risk charges capture the potential losses resulting from credit defaults. We generally capture potential unexpected losses because we assume earnings and credit provisions are sufficient to cover expected losses. We apply capital charges to all the major sources of credit risk at insurance companies, including bonds and loans, credit derivatives, mortgages, and counterparty credit exposure relating to reinsurance contracts, deposits, and over-the-counter (OTC) derivative contracts.

Bonds and loans

To calculate capital requirements for credit default risk, we apply a charge based on the tenor of the bond or loan, the rating, and the recovery category. We define the tenor of the security as the final maturity date unless it is an amortizing bond, in which case we use the weighted average life. We apply the charge to the market value of the bond or loan. Where we exclude from ACE the unrealized gains and losses on fixed-income assets, we may apply the charge to the amortized cost of the bond or loan.

To develop the capital charges for each rating category, we used a stochastic model to evaluate the performance of a hypothetical, well-diversified pool of assets. The assets were well diversified by issuer count and sector to reflect the typical insurer bond portfolio. We also based the mix by rating modifier within each rating category (for example, the proportions of 'A+', 'A', and 'A-' within the 'A' category) on our research of industry holdings.

The starting point for developing the charges was deriving scenario default rates for the asset pool for each rating category. This involved applying asset default rate assumptions that we calibrated based on observed corporate default rates and combining these with correlation assumptions between the assets.

To determine the loss given default, we applied our recovery assumptions, which were informed both by our research on observed recovery rates and assumptions used for other asset classes. The recovery assumptions we apply at the 99.5% confidence level are 65% in category 1, 35% in category 2, and 15% in category 3.

For structured finance exposures, our recovery assumptions vary based on the rating on the asset because we use the rating as an indicator for its level of subordination. Therefore, the lower the

rating on a structured finance exposure, the lower the assumed recovery.

To allocate assets to recovery categories, we considered historical recovery rates and chose the best fit across the four categories. See table 37 in Appendix II, "Market Variables," for details on the allocation of exposures to each recovery category.

To determine stressed losses for each tenor at the 99.5% confidence level, we applied rating quantiles specific to the tenor, which were calibrated based on observed corporate default rates, to the discounted post-recovery loss distribution. We converted the stressed losses to stressed loss rates and then deducted expected loss rates (other than for assets rated 'CCC+' or lower) to determine the unexpected loss rates that we use for our capital charges at the 99.5% confidence level. We assumed a log-normal distribution to generate the capital charges for the other confidence levels.

We applied this methodology to determine charges by rating category across five tenor groupings for the four recovery categories (see tables 3-6). We used the midpoint of each tenor grouping to calibrate our charges (and 25 years for the greater-than-20-year category). Where we do not have sufficient information on the split of exposures by recovery category, we apply table 4.

Table 3

Credit Risk Charges For Bonds And Loans (Category 1)

(%)	--Capital charges--			
	99.99%	99.95%	99.8%	99.5%
1 year or less				
AAA	0.07	0.06	0.05	0.04
AA	0.20	0.15	0.12	0.10
A	0.35	0.27	0.22	0.18
BBB	0.48	0.38	0.31	0.25
BB	1.26	1.00	0.80	0.66
B	3.50	2.76	2.21	1.84
CCC to C	27.77	21.92	17.54	14.61
D	44.00	41.00	38.00	35.00
More than 1 but less than or equal to 5 years				
AAA	0.18	0.15	0.12	0.10
AA	0.46	0.36	0.29	0.24
A	0.83	0.66	0.53	0.44
BBB	1.70	1.35	1.08	0.90
BB	4.71	3.72	2.97	2.48
B	9.25	7.30	5.84	4.87
CCC to C	44.00	36.03	28.82	24.02
D	44.00	41.00	38.00	35.00
More than 5 but less than or equal to 10 years				
AAA	0.37	0.29	0.23	0.19
AA	0.97	0.76	0.61	0.51
A	1.32	1.04	0.83	0.70

Table 3

Credit Risk Charges For Bonds And Loans (Category 1) (cont.)

(%)	--Capital charges--			
	99.99%	99.95%	99.8%	99.5%
BBB	2.70	2.13	1.71	1.42
BB	6.43	5.08	4.06	3.39
B	9.95	7.86	6.28	5.24
CCC to C	44.00	36.94	29.55	24.63
D	44.00	41.00	38.00	35.00
More than 10 but less than or equal to 20 years				
AAA	0.53	0.42	0.33	0.28
AA	1.19	0.94	0.75	0.62
A	1.76	1.39	1.11	0.93
BBB	3.16	2.49	1.99	1.66
BB	6.69	5.28	4.23	3.52
B	9.95	7.86	6.28	5.24
CCC to C	44.00	37.42	29.94	24.95
D	44.00	41.00	38.00	35.00
Over 20 years				
AAA	0.85	0.67	0.54	0.45
AA	1.37	1.09	0.87	0.72
A	1.92	1.52	1.21	1.01
BBB	3.16	2.49	1.99	1.66
BB	6.69	5.28	4.23	3.52
B	9.95	7.86	6.28	5.24
CCC to C	44.00	37.42	29.94	24.95
D	44.00	41.00	38.00	35.00

References to ratings include all rating modifiers within the rating category (e.g., 'A' includes bonds rated 'A+', 'A', and 'A-').

Table 4

Credit Risk Charges For Bonds And Loans (Category 2)

(%)	--Capital charges--			
	99.99%	99.95%	99.8%	99.5%
1 year or less				
AAA	0.14	0.11	0.09	0.07
AA	0.36	0.29	0.23	0.19
A	0.64	0.51	0.41	0.34
BBB	0.90	0.71	0.57	0.47
BB	2.34	1.85	1.48	1.23
B	6.49	5.12	4.10	3.42

Table 4

Credit Risk Charges For Bonds And Loans (Category 2) (cont.)

(%)	--Capital charges--			
	99.99%	99.95%	99.8%	99.5%
CCC to C	51.57	40.71	32.57	27.14
D	72.00	70.00	67.00	65.00
More than 1 but less than or equal to 5 years				
AAA	0.34	0.27	0.22	0.18
AA	0.85	0.67	0.54	0.45
A	1.55	1.22	0.98	0.81
BBB	3.16	2.50	2.00	1.67
BB	8.74	6.90	5.52	4.60
B	17.18	13.56	10.85	9.04
CCC to C	72.00	66.91	53.53	44.61
D	72.00	70.00	67.00	65.00
More than 5 but less than or equal to 10 years				
AAA	0.68	0.54	0.43	0.36
AA	1.79	1.42	1.13	0.94
A	2.45	1.94	1.55	1.29
BBB	5.02	3.96	3.17	2.64
BB	11.95	9.43	7.55	6.29
B	18.48	14.59	11.67	9.73
CCC to C	72.00	68.61	54.89	45.74
D	72.00	70.00	67.00	65.00
More than 10 but less than or equal to 20 years				
AAA	0.98	0.78	0.62	0.52
AA	2.20	1.74	1.39	1.16
A	3.27	2.58	2.06	1.72
BBB	5.86	4.63	3.70	3.08
BB	12.43	9.81	7.85	6.54
B	18.48	14.59	11.67	9.73
CCC to C	72.00	69.50	55.60	46.33
D	72.00	70.00	67.00	65.00
Over 20 years				
AAA	1.58	1.25	1.00	0.83
AA	2.55	2.02	1.61	1.34
A	3.57	2.82	2.25	1.88
BBB	5.86	4.63	3.70	3.08
BB	12.43	9.81	7.85	6.54
B	18.48	14.59	11.67	9.73

Table 4

Credit Risk Charges For Bonds And Loans (Category 2) (cont.)

(%)	--Capital charges--			
	99.99%	99.95%	99.8%	99.5%
CCC to C	72.00	69.50	55.60	46.33
D	72.00	70.00	67.00	65.00

References to ratings include all rating modifiers within the rating category (e.g., 'A' includes bonds rated 'A+', 'A', and 'A-').

Table 5

Credit Risk Charges For Bonds And Loans (Category 3)

(%)	--Capital charges--			
	99.99%	99.95%	99.8%	99.5%
1 year or less				
AAA	0.18	0.14	0.11	0.09
AA	0.48	0.38	0.30	0.25
A	0.84	0.66	0.53	0.44
BBB	1.17	0.93	0.74	0.62
BB	3.07	2.42	1.94	1.61
B	8.49	6.70	5.36	4.47
CCC to C	67.44	53.24	42.59	35.49
D	88.00	87.00	86.00	85.00
More than 1 but less than or equal to 5 years				
AAA	0.45	0.35	0.28	0.24
AA	1.12	0.88	0.71	0.59
A	2.02	1.60	1.28	1.07
BBB	4.14	3.27	2.61	2.18
BB	11.43	9.03	7.22	6.02
B	22.46	17.73	14.19	11.82
CCC to C	88.00	87.00	70.00	58.33
D	88.00	87.00	86.00	85.00
More than 5 but less than or equal to 10 years				
AAA	0.89	0.70	0.56	0.47
AA	2.35	1.85	1.48	1.24
A	3.21	2.53	2.03	1.69
BBB	6.56	5.18	4.14	3.45
BB	15.62	12.34	9.87	8.22
B	24.17	19.08	15.26	12.72
CCC to C	88.00	87.00	71.77	59.81
D	88.00	87.00	86.00	85.00

Table 5

Credit Risk Charges For Bonds And Loans (Category 3) (cont.)

(%)	--Capital charges--			
	99.99%	99.95%	99.8%	99.5%
More than 10 but less than or equal to 20 years				
AAA	1.29	1.02	0.81	0.68
AA	2.88	2.27	1.82	1.52
A	4.27	3.37	2.70	2.25
BBB	7.66	6.05	4.84	4.03
BB	16.25	12.83	10.27	8.55
B	24.17	19.08	15.26	12.72
CCC to C	88.00	87.00	72.71	60.59
D	88.00	87.00	86.00	85.00
Over 20 years				
AAA	2.06	1.63	1.30	1.09
AA	3.34	2.64	2.11	1.76
A	4.66	3.68	2.95	2.46
BBB	7.66	6.05	4.84	4.03
BB	16.25	12.83	10.27	8.55
B	24.17	19.08	15.26	12.72
CCC to C	88.00	87.00	72.71	60.59
D	88.00	87.00	86.00	85.00

References to ratings include all rating modifiers within the rating category (e.g., 'A' includes bonds rated 'A+', 'A', and 'A-').

Table 6

Credit Risk Charges For Bonds And Loans (Category 4)

(%)	--Capital charges--			
	99.99%	99.95%	99.8%	99.5%
1 year or less				
AAA	0.08	0.06	0.05	0.04
AA	0.25	0.20	0.16	0.13
A	0.93	0.74	0.59	0.49
BBB	1.20	0.95	0.76	0.63
BB	4.15	3.28	2.62	2.19
B	12.25	9.67	7.74	6.45
CCC to C	83.30	65.77	52.61	43.84
D	100.00	100.00	100.00	100.00
More than 1 but less than or equal to 5 years				
AAA	0.19	0.15	0.12	0.10
AA	0.58	0.46	0.37	0.31

Table 6

Credit Risk Charges For Bonds And Loans (Category 4) (cont.)

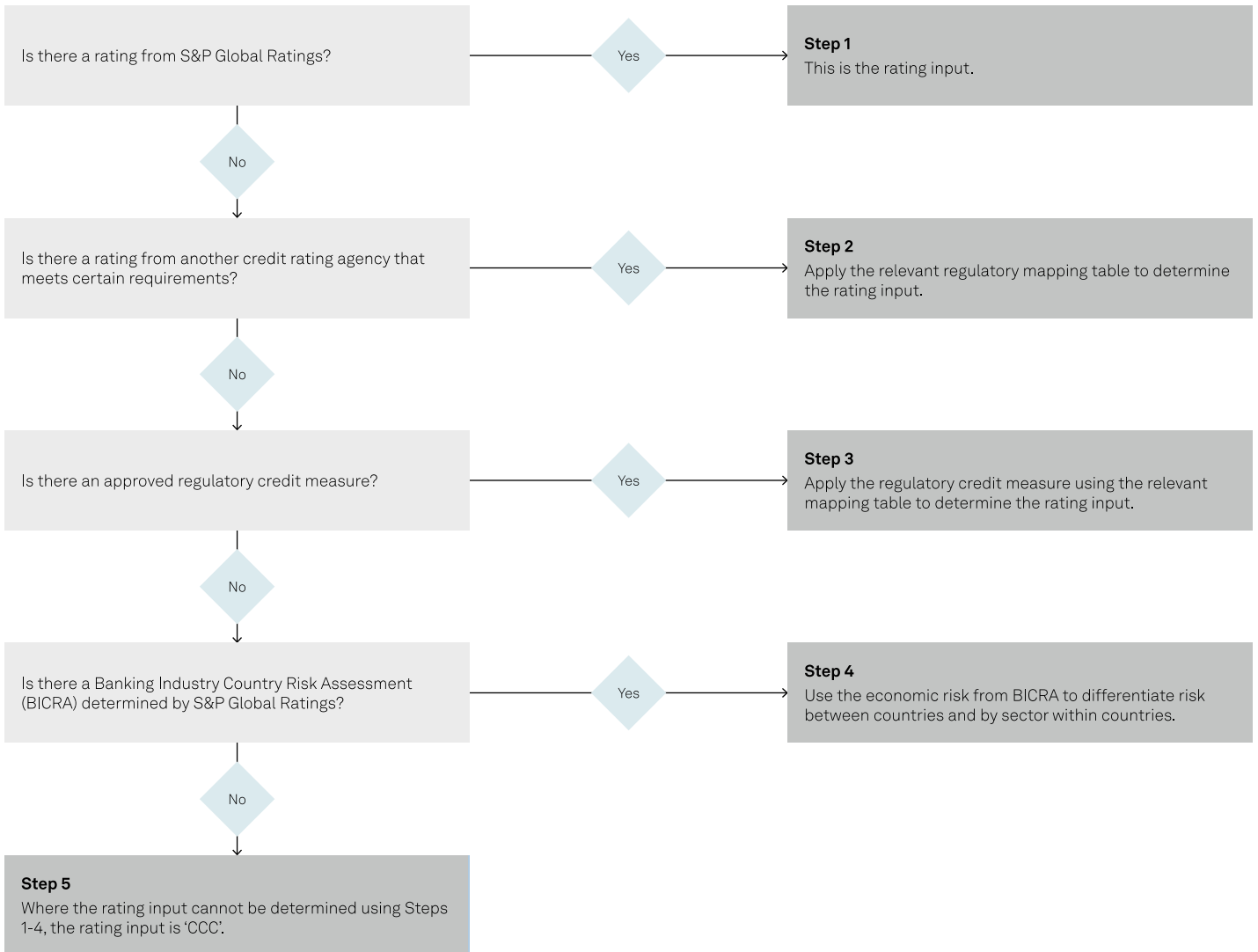
(%)	--Capital charges--			
	99.99%	99.95%	99.8%	99.5%
A	2.18	1.72	1.38	1.15
BBB	4.13	3.26	2.61	2.17
BB	15.58	12.30	9.84	8.20
B	32.85	25.94	20.75	17.29
CCC to C	100.00	100.00	86.47	72.06
D	100.00	100.00	100.00	100.00
More than 5 but less than or equal to 10 years				
AAA	0.39	0.31	0.25	0.21
AA	1.25	0.99	0.79	0.66
A	3.57	2.81	2.25	1.88
BBB	6.71	5.30	4.24	3.53
BB	22.29	17.60	14.08	11.73
B	36.61	28.90	23.12	19.27
CCC to C	100.00	100.00	88.66	73.88
D	100.00	100.00	100.00	100.00
More than 10 but less than or equal to 20 years				
AAA	0.57	0.45	0.36	0.30
AA	1.56	1.23	0.99	0.82
A	4.91	3.87	3.10	2.58
BBB	8.03	6.34	5.07	4.23
BB	24.03	18.97	15.17	12.65
B	36.61	28.90	23.12	19.27
CCC to C	100.00	100.00	89.81	74.85
D	100.00	100.00	100.00	100.00
Over 20 years				
AAA	0.92	0.73	0.58	0.49
AA	1.86	1.47	1.18	0.98
A	5.56	4.39	3.51	2.92
BBB	8.18	6.46	5.16	4.30
BB	24.03	18.97	15.17	12.65
B	36.61	28.90	23.12	19.27
CCC to C	100.00	100.00	89.81	74.85
D	100.00	100.00	100.00	100.00

References to ratings include all rating modifiers within the rating category (e.g., 'A' includes bonds rated 'A+', 'A', and 'A-').

To apply tables 3-6, we determine the rating input of bonds and loans using the steps in chart 4:

Chart 4

Determining the rating input of bonds and loans



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Step 1: Assets Rated By S&P Global Ratings

For bond and loan assets that have global scale ratings from S&P Global Ratings, the rating input is the S&P Global Ratings global scale rating. For assets that have regional or national scale ratings from S&P Global Ratings, we map to the equivalent S&P Global Ratings global scale rating. We typically map a regional or national scale rating that maps to more than one global scale rating to the lower outcome in the mapping table in the absence of further information.

Step 2: Assets Rated By Other Credit Rating Agencies (CRAs)

For assets that are not rated by S&P Global Ratings but carry ratings from other CRAs, we base our rating input on the CRA's ratings, using a regulatory mapping table, without adjustment. If there is more than one CRA rating for an asset, the rating input is typically based on the lowest mapped CRA rating the issuer uses for regulatory reporting purposes.

For the purposes of this step, we include ratings from CRAs that are:

- Registered or certified in accordance with relevant CRA regulations;
- Included in a mapping table that is used by insurance regulators in establishing capital requirements for credit assets;
- Included in a regulatory mapping table that relates the CRA's rating scale to S&P Global Ratings' global rating scale; and
- Included in a mapping table that is publicly available.

We typically apply the mapping table used by an insurer's domestic regulator. Examples of mapping tables include, but are not limited to, those produced by the National Assn. of Insurance Commissioners (NAIC) and used by state insurance regulators in the U.S. or those determined by the European Supervisory Authorities for use under the Solvency II Directive.

In the absence of a mapping table used by the domestic regulator that meets the requirements above--or for a regulatory mapping table that does not include all CRAs--we may apply a regulatory mapping table used in one country or region that meets the requirements above to another to support global consistency. We use these regulatory mapping tables solely for the purpose of determining the rating input to apply capital charges.

Step 3: Assets With Regulatory Credit Measures

For assets that are not included under steps 1 and 2 but carry credit measures approved by the insurer's domestic regulator, the rating input is based on the regulatory credit measures using the mapping tables from step 2. Examples of regulatory credit measures are NAIC designations assigned by the Securities Valuation Office in the U.S., as well as insurers' internal credit scores that are mapped to credit quality steps under Solvency II and accepted for the determination of capital requirements by the insurer's regulator.

Step 4: Assets Not Included In Steps 1-3

For assets that are not included in steps 1-3, we determine the rating input based on the economic risk score from our Banking Industry Country Risk Assessment to differentiate risk between countries and by sector within countries. (See table 38 in Appendix II, "Market Variables," for the rating input assumptions by sector and economic risk group.) We determined the rating input assumptions for all sectors by considering factors such as the average rating and lowest average rating in each sector for all countries within each economic risk group and based on our analytical judgment.

The relevant economic risk group is based on the domicile of the issuer of the bond or loan, although we may assume it is in the same country as the insurer in the absence of additional information. Where we have not determined an economic risk group for a country, we may use estimates or proxies. Where we do not receive sufficient information on the split of exposures, we typically assume that structured finance exposures are the junior tranches and non-structured-finance exposures are nonfinancial corporates.

When we apply step 4, we may adjust up or down by at most one rating category the credit quality assumption for any given combination of economic risk group and sector. We make the adjustment when we have additional information that indicates the average credit quality assumption for assets included in step 4 is, in our view, materially higher or lower than our standard assumption. For example, this adjustment could apply if the sovereign credit rating is 'CCC+' or lower and the outcome from this step is 'B' or higher. We make the adjustment at the portfolio level, rather than on a security-by-security basis.

Step 5: Assets Not Included In Steps 1-4

Where the rating input cannot be determined using steps 1-4, the rating input is 'CCC'. In all cases, the rating input is 'D' (default) for a bond that is rated 'D' or equivalent under steps 1, 2, or 3.

Additional Considerations

Where a bond or loan is not rated but the issuer is rated by a CRA such that step 1 or step 2 would otherwise apply to the CRA's ratings, we may assume a rating input:

- at the same level as the issuer credit rating for senior unsecured and senior secured exposures; or
- one notch below the issuer credit rating for subordinated exposures.

Where the regulatory mapping table maps multiple ratings from S&P Global Ratings to a single regulatory credit measure or a single rating from another CRA, the rating input is typically based on the lowest mapped rating from S&P Global Ratings.

We typically limit rating inputs in any given jurisdiction to a level no higher than we typically assign (this limit reflects our criteria for ratings above the sovereign). We may perform additional analysis, such as applying our criteria for ratings above the sovereign, for rating inputs that exceed the sovereign rating (i.e., where a different rating input could have a material impact).

We may perform additional analysis to determine an alternative measure of credit quality, such as establishing credit estimates or determining credit opinions, where the additional analysis could result in a material impact.

OTC derivative counterparties

Where we determine that the counterparty credit exposure relating to OTC derivative contracts is material, we apply the credit risk charges in table 4. We apply the charge, based on the average tenor of the exposure and the rating on the counterparty, to the related net unrealized gains of the derivative contract (unrealized gains and losses with the same counterparty are netted).

Where we determine exposures relating to OTC derivatives are immaterial, we apply a single charge from table 4 to the aggregate net unrealized gain assuming an 'A' rating and five-to-10-year tenor.

We may give credit for counterparty netting and risk mitigation techniques, such as collateralization provisions, but may reduce the value of collateral to reflect risk where this is material (for example, by applying the relevant asset risk charge to the collateral). We do not apply credit risk charges to exchange-traded or centrally cleared derivatives.

Credit default swaps

Where we determine that credit exposures relating to credit default swaps are material, we will apply capital charges to the exposure. To determine the exposure when the insurer has "long" credit exposure, we will apply the credit risk factors in table 4, based on the tenor of the swap and the rating on the referenced party, to the notional amount of the swap. We will apply the methodology for OTC derivatives for exposures to counterparties resulting from "short" positions (purchased protection). Where companies purchase credit default swaps to mitigate other credit exposures, we may factor this into the credit risk capital requirements if material.

Mortgages

To calculate capital requirements for credit risk on mortgage loans, we apply a charge that differentiates risks for commercial and residential mortgage loans. For commercial mortgage loans, we differentiate risks for mortgages in good standing (i.e., performing mortgage loans) based on the loan-to-value (LTV) ratio and the debt service coverage ratio (DSCR). We also use LTV to differentiate capital requirements for higher-risk construction loans, delinquent (i.e., nonperforming) mortgages, and loans in foreclosure. For residential mortgage loans, we differentiate risks for performing mortgages based on LTV and apply separate capital charges for nonperforming mortgages.

The capital charges for commercial mortgages are informed by our analysis of the performance and underwriting quality of mortgage loans held by U.S. life insurers. To develop the capital charges, we determined the stressed principal loss factor and the probability of foreclosure for each confidence level, assuming a normal distribution. We then adjusted for the loan characteristics, including LTV and the DSCR. For residential mortgages, the capital charges are informed by our analysis of the performance of mortgage insurers.

Where we determine the exposure to commercial mortgage loans is material, we apply the charges in table 7. If the split by LTV and DSCR is not available, we typically assume the exposures are high risk and apply the charges for LTV greater than 80% and a DSCR less than 1.1x. If the split by LTV is available, but not the split by DSCR, we apply the charges for a DSCR of less than 1.1x based on the LTV. If we determine the exposure to commercial mortgage loans is immaterial, we usually apply the charges for LTV of 60%-80% and a DSCR of 1.1x-1.4x to all exposures.

Table 7

Credit Risk Charges For Commercial Mortgage Loans

		--Capital charges--					
Loan to value (%)	--In good standing--	Construction loans			Delinquent loans		In process of foreclosure
		--Debt service coverage ratios--					
		> 1.4x	1.1x to 1.4x	< 1.1x			
99.5%							
<60	2.1	3.0	4.3	12.9	22.0	43.9	
60-80	2.9	4.1	5.9	17.6	30.1	60.2	
>80	3.5	4.8	6.9	20.7	35.4	70.8	
99.8%							
<60	2.7	3.8	5.5	16.4	25.4	50.8	
60-80	3.5	5.0	7.1	21.2	32.8	65.6	
>80	4.1	5.7	8.1	24.3	37.6	75.2	
99.95%							
<60	3.7	5.1	7.3	22.0	30.1	60.2	
60-80	4.4	6.2	8.9	26.7	36.5	73.0	
>80	5.0	6.9	9.9	29.7	40.6	81.3	

Table 7

Credit Risk Charges For Commercial Mortgage Loans (cont.)

(%)	Loan to value	--Capital charges--					
		--In good standing--			Construction loans	Delinquent loans	In process of foreclosure
		--Debt service coverage ratios--					
		> 1.4x	1.1x to 1.4x	< 1.1x			
99.99%							
	<60	4.8	6.7	9.5	28.6	34.9	69.9
	60-80	5.5	7.7	11.0	33.0	40.3	80.6
	>80	6.0	8.4	11.9	35.8	43.8	87.6

Where we determine the exposure to residential mortgage loans is material, we apply the charges in table 8. If the split by LTV is not available, we typically assume the exposures are high risk and apply the charges for LTV greater than 80%. If we determine the exposure to residential mortgage loans is immaterial, we usually apply the charges for LTV of 60%-80% to all exposures.

Table 8

Credit Risk Charges For Residential Mortgage Loans

(%)	Loan to value	--Capital charges--	
		Performing loans	Nonperforming loans
99.5%			
	<60	1.5	
	60-80	2.0	
	>80	2.4	
			20.0
99.8%			
	<60	1.9	
	60-80	2.5	
	>80	2.8	
			25.0
99.95%			
	<60	2.6	
	60-80	3.1	
	>80	3.4	
			30.0
99.99%			
	<60	3.3	
	60-80	3.8	
	>80	4.2	

Table 8

Credit Risk Charges For Residential Mortgage Loans (cont.)

(%)	Loan to value	--Capital charges--	
		Performing loans	Nonperforming loans
			35.0

The residential mortgage risk charges assume the exposures are standard-repayment or interest-only residential mortgage loans for the purpose of financing a borrower's primary residential property (i.e., owner-occupied property). We include exposures to higher-risk residential mortgage loans as commercial mortgage loans where these exposures are material and we determine this better captures the credit risk (for example, for agricultural mortgages, residential mortgages that depend on income generated on the property, reverse mortgages, and equity release mortgages). We typically assume these higher-risk residential mortgages are high-risk commercial mortgage loans and apply the charges for a DSCR of less than 1.1x and LTV greater than 80%.

Reinsurance counterparties

To calculate capital requirements for reinsurance counterparty default risk, we apply a charge based on the assumed tenor of the exposure and the rating on the reinsurer. To develop the capital charges, we applied the same scenario default rates we use for credit risk on bonds and loans but assumed a recovery rate of 50%. We assume the tenor of the exposures is five to 10 years (other than for catastrophe-related exposures, where we assume one to five years).

We apply the charges in table 9 to reinsurers' share of outstanding loss reserves (including the reinsurers' share of the net present value of future claims payments under longevity swaps) and reinsurance receivables. We apply the charges in table 10 to reinsurers' share of stressed catastrophe losses (contingent reinsurance credit risk), and we include both natural catastrophe losses and mortality catastrophe losses (e.g., pandemic losses).

We apply the capital charges in table 10 to the uncollateralized reinsurance recoveries expected at each stress scenario. For pandemic risk, the uncollateralized reinsurance recoveries are calculated as the pandemic risk charge (see table 29) multiplied by the reinsurer's share of the gross amount at risk (or gross sums assured). We include the credit risk capital requirements for contingent reinsurance counterparty risk in the relevant natural catastrophe and pandemic risk capital requirements.

Table 9

Credit Risk Charges For Reinsurance Counterparty Risks

(%)	--Capital charges--			
	99.99%	99.95%	99.8%	99.5%
AAA	0.52	0.41	0.33	0.28
AA	1.38	1.09	0.87	0.73
A	1.89	1.49	1.19	0.99
BBB	3.86	3.05	2.44	2.03
BB	9.19	7.26	5.80	4.84

Table 9

Credit Risk Charges For Reinsurance Counterparty Risks (cont.)

(%)	--Capital charges--			
	99.99%	99.95%	99.8%	99.5%
B	14.21	11.22	8.98	7.48
CCC	58.00	52.77	42.22	35.18
D	58.00	55.00	53.00	50.00

The capital charges apply to reinsurers' share of outstanding loss reserves and reinsurance receivables.

Table 10

Credit Risk Charges For Contingent Reinsurance Counterparty Risks

(%)	--Capital charges--			
	99.99%	99.95%	99.8%	99.5%
Reinsurers' share of stressed catastrophe losses	1.19	0.94	0.75	0.63

To determine the rating input for reinsurance counterparties, we apply steps 1-3 in chart 4 using the financial strength rating or equivalent. For any reinsurance counterparties for which we cannot determine the rating input based on steps 1-3, we assume a 'B' rating input. We may adjust this assumption down to 'CCC' if we believe payments from a reinsurer are vulnerable to nonpayment.

If letters of credit from a financially secure financial institution, reinsurance deposits, or suitable trust assets are available to offset the counterparty credit risk relating to reinsurers, we include credit for up to 100% of the collateral to offset the reinsurance counterparty credit risk charge. We may reduce the value of collateral to reflect risk where this is material (for example, by applying the relevant asset risk charge to the collateral).

Deposits with credit institutions

We apply a charge to cash and bank deposits to reflect the counterparty risk associated with these assets. We assume that the deposits are uninsured and that there is no general depositor preference for corporate deposits. Because bank deposits are usually short-term assets, the capital charges are informed by the credit risk charges for bonds and loans with a tenor of less than one year and recoveries aligned with category 2.

We use the sovereign credit rating as a proxy for the credit risk associated with bank deposits. The charges we apply to cash and bank deposits in table 11 are based on the relevant local currency sovereign rating for the bank's domicile. To determine the relevant local currency sovereign rating, we apply steps 1-5 in chart 4.

Table 11

Credit Risk Charges For Bank Deposits

(%)	--Capital charges--			
	99.99%	99.95%	99.8%	99.5%
Sovereign local currency rating				
A- or higher	0.30	0.24	0.19	0.16
BBB	0.78	0.62	0.49	0.41
BB or B	2.16	1.71	1.37	1.14
CCC+ or lower	17.19	13.57	10.86	9.05

References to ratings include all ratings in the relevant category (e.g., 'BBB' includes 'BBB+', 'BBB', and 'BBB-').

Deposits with cedents

We apply the charges in table 12 to deposits with cedents. The capital charges are informed by the credit risk charges for bonds and loans with a tenor of less than one year, a 50% recovery assumption, and 'BBB' assumed credit quality.

Table 12

Credit Risk Charges For Deposits With Cedents

(%)	--Capital charges--			
	99.99%	99.95%	99.8%	99.5%
Deposits with cedents	0.69	0.54	0.44	0.36

Corporate-owned life insurance (COLI)

We apply the credit risk charges in table 4 to COLI assets. We apply the charge based on the rating on the insurance counterparty and assume the tenor is over 20 years. This is based on the assumption that the insurer has the willingness and ability to hold the COLI asset until maturity and that volatility in the carrying value of the COLI asset does not represent a material risk.

To determine the rating input for insurance counterparties, we apply steps 1-3 in chart 4, using the financial strength rating or equivalent. For any insurance counterparties for which we cannot determine the rating input based on steps 1-3, we assume a 'B' rating input. We may adjust this assumption to 'CCC' if we believe payments from an insurer are vulnerable to nonpayment.

Other chargeable assets

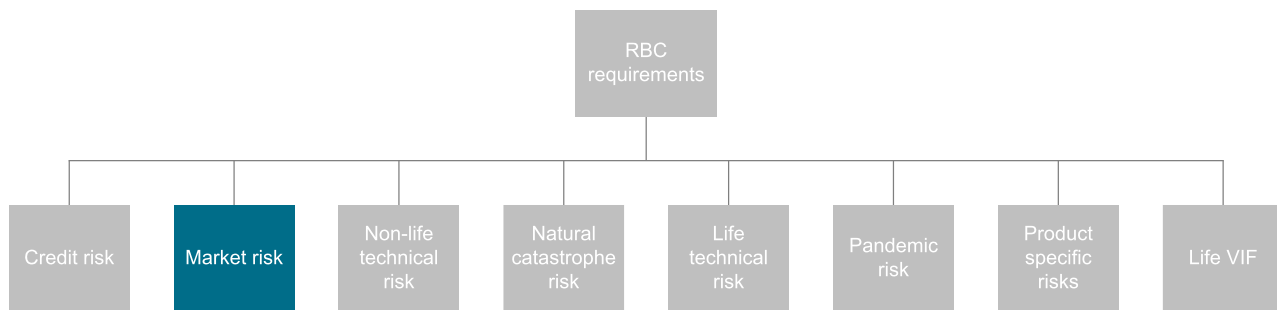
We apply the credit risk charges in table 13 to assets such as insurance premium receivables, leases, low-income housing tax credits, prepaid expenses, third-party administrator fees, and receivables under administrative services only (ASO) and administrative services contracts (ASCs). The capital charges are informed by the credit risk charges for bonds and loans with a tenor of less than one year and zero recovery.

Table 13

Credit Risk Charges For Other Chargeable Assets

(%)	--Capital charges--			
	99.99%	99.95%	99.8%	99.5%
Other chargeable assets	9.5	7.5	6.0	5.0

Market Risk



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Market risk charges capture the potential losses in stress scenarios from movements in equity and real estate markets, as well as interest rates and systemic credit spreads.

Equity risk

We apply capital charges to the fair value of equity investments to capture the potential losses in stress scenarios on the assumption of a buy-and-hold strategy. We apply capital charges to three different types of equity investments: listed securities, unlisted securities, and infrastructure equities with specific low-risk attributes ("eligible infrastructure equities"; see glossary). We differentiate risk typically based on the domicile of the equity investment (see table 14). We may also apply the equity risk charge to other assets where we consider the asset value to be exposed to equity market volatility.

To determine the capital charges for listed equities, we analyzed the volatility of stock market indices in various countries over the past 30 years. For eligible infrastructure equities, we analyzed the volatility of infrastructure equity market indices and considered regulatory capital charges. We calibrated this volatility to our stress scenarios and applied factors based on log-normal assumptions to determine the charges at each confidence level. Our capital charges assume a highly diverse listed equity portfolio or eligible infrastructure equity portfolio.

We classify listed equity investments into four equity market groups by country based on several factors, such as the volatility we have observed in that country's main stock market index over the

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past 30 years, the level of stress in the economy experienced in the worst one-year performance of the domestic index, our assessment of the depth and breadth of the domestic capital markets, the foreign currency sovereign credit rating, and the inclusion of the country in one of the MSCI world indices. See table 39 in Appendix II, "Market Variables," for the allocation of countries to equity market groups.

We apply higher charges to unlisted equities in each of the four equity market groups, based on our view of the higher average risk of unlisted stocks, owing to their generally higher leverage, valuation risk, and illiquidity.

We classify eligible infrastructure equities into two categories by country based on several factors, such as our view on country risk and the predictability of regulation and government policy. See table 39 in Appendix II, "Market Variables," for the allocation of countries to infrastructure equity categories. For infrastructure equity investments that are not eligible infrastructure equities (see glossary), we apply the listed or unlisted equity capital charges for the relevant equity market group.

We apply the capital charges for group 1 to investments in hedge funds (listed or unlisted, as applicable). For investments in mutual funds and other collective investments, we apply the capital charge for the most relevant equity market group, based on the predominant country or countries of the underlying investment holdings, when the underlying exposures are primarily equities. Where the underlying exposures in a fund are primarily bonds, we may treat the investment as a bond if we have sufficient information on the underlying investments (e.g., rating and tenor) and there are no additional risks (e.g., leverage).

Table 14

Market Risk Charges For Equities

Equity market group		--Capital charges--			
		99.99%	99.95%	99.8%	99.5%
1	Listed	55	50	45	40
	Unlisted	66	60	54	48
2	Listed	66	60	54	48
	Unlisted	77	70	63	56
3	Listed	77	70	63	56
	Unlisted	88	80	72	64
4	Listed	88	80	72	64
	Unlisted	99	90	81	72
Infrastructure - category 1*		48	44	39	35
Infrastructure - category 2*		69	63	56	50

Note: See table 39 in Appendix II, "Market Variables," for the allocation of countries to equity market groups. *Eligible infrastructure equities (see glossary).

Real estate risk

We apply capital charges to the fair value of direct real estate (or property) investments to capture the potential losses in stress scenarios. Where the fair value is not available (and therefore not captured in TAC), we use the reported value. We apply capital charges to two different types of real

estate investments: investment real estate and owner-occupied property. We differentiate risk based on the domicile of the real estate investment (see table 15). We typically apply equity risk charges to investments in REITs and real estate companies.

To determine the capital charges, we analyzed the annual volatility of both commercial and residential real estate indices in various countries over at least the past 15 years. We calibrated this volatility to our stress scenarios based on a log-normal distribution to determine the charges at each confidence level. Our capital charges assume a highly diverse real estate portfolio.

We classify real estate investments into four groups by country, based primarily on the annual volatility we have observed in that country's real estate index over at least the past 15 years. We also applied analytical judgment where the index data for a country was more heavily weighted toward residential real estate. This is based on our view that insurers tend to have higher exposure to commercial real estate, which we believe is a more volatile sector than residential real estate. See table 40 in Appendix II, "Market Variables," for the allocation of countries to real estate groups.

Table 15

Market Risk Charges For Real Estate

Real estate group		--Capital charges--			
		99.99%	99.95%	99.8%	99.5%
1	Investment	15	13	11	9
	Owner occupied	23	20	17	14
2	Investment	20	18	15	12
	Owner occupied	28	25	21	17
3	Investment	30	27	24	20
	Owner occupied	38	34	30	25
4	Investment	35	31	27	24
	Owner occupied	43	38	33	29

See table 40 in Appendix II, "Market Variables," for the allocation of countries to real estate groups.

We apply higher charges to owner-occupied property in each of the four real estate groups, based on our view of the higher risk to the value of the property in a stress scenario where the insurer is both the owner and tenant of the property (see table 15).

Interest rate risk

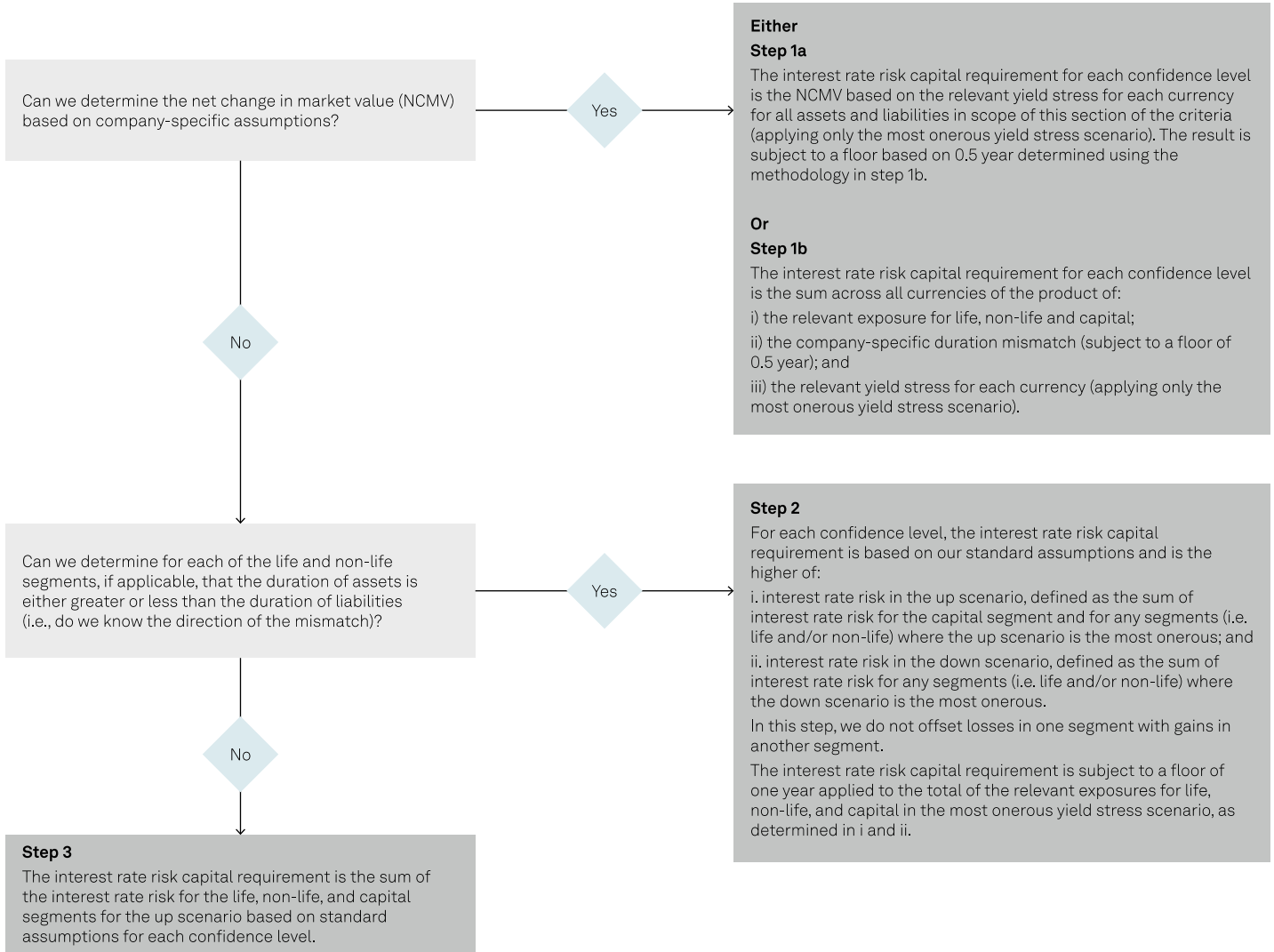
We apply capital charges to capture the potential economic losses in stress scenarios from movements in interest rates and systemic credit spreads due to net exposure mismatches. We measure interest rate risk using two elements: a yield stress and the net exposure to interest rate risk. For our yield stresses, we assume permanent parallel shifts in observable yields that vary by country.

We define the potential economic losses as the net change in market value (NCMV), which we determine for each confidence level. The NCMV captures the net impact of changes in interest rates and systemic credit spreads on the market value of assets and proxy market value of liabilities, factoring in risk mitigants such as hedge instruments and the ability to share losses with policyholders (by adjusting crediting rates, policyholder dividends, or bonuses).

We apply one of three steps to determine the NCMV and therefore the interest rate risk capital requirements (see chart 5). We apply either company-specific assumptions (step 1) or standard assumptions (steps 2 and 3), in all cases using our defined yield stresses.

Chart 5

Determining the interest rate risk capital requirement



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Step 1

To determine the NCMV based on company-specific assumptions (step 1), we either directly derive the NCMV based on our defined yield stresses (step 1a) or estimate the NCMV based on a company-specific duration mismatch and our defined yield stresses (step 1b). Where we use duration mismatch to capture the net exposure to interest rate risk, it measures the net percentage change in the market value or proxy market value for a 100-basis-point change in yields. We typically use a volume-weighted measure of duration (we don't deduct the duration in years of the liabilities from the duration in years of the assets).

Where we apply step 1, we analyze information (including the underlying assumptions) from, or based on, risk-based regulatory frameworks, an insurer's internal model, or an insurer's own risk reporting. We may also assess other information, such as alternative interest rate risk metrics (e.g., DVO1s), an insurer's interest rate risk limits, an insurer's duration mismatch (over time and relative to risk limits), and an insurer's strategy for managing interest rate risk. For example, we may apply a higher NCMV or duration mismatch than the current position if there is historical volatility in the NCMV or duration mismatch over time, or we may use the maximum NCMV or duration mismatch implied by risk limits.

The company-specific assumptions may, therefore, differ from an insurer's view of its risk and can be higher or lower than our standard assumptions. We also apply a floor based on a mismatch assumption of 0.5 year when we apply company-specific assumptions (the value of the floor in step 1a and step 1b is determined using the duration mismatch methodology under step 1b).

Where we apply step 1, the company-specific assumptions capture the group balance sheet in full. We expect the company-specific assumptions to reflect the magnitude of our yield stress, but they may also incorporate a company-specific view on the extent of the stress at the long end of the yield curve where market data may not be available.

We do not apply step 1 for an insurer that does not measure interest rate risk or where we are unable to determine company-specific assumptions that we believe adequately capture an insurer's net exposure to interest rate risk. We may also not apply step 1 for an insurer that has no interest rate risk limits or where we determine an insurer's interest rate risk is immaterial.

Steps 2 & 3

For step 2, where we determine that an insurer manages interest rate risk across different segments (life, non-life, and capital) such that it reduces its overall interest rate risk, we capture this in our analysis, but only when we believe the risk reduction is material and sustainable. For example, if the direction of the mismatch for one of the segments fluctuates from one year to the next (or we believe the mismatch is close to zero), we may determine the risk reduction is not sustainable and apply step 3.

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To determine our yield stresses, we analyzed the annual volatility of investment-grade corporate bond yields in various countries, using a methodology consistent with the Hull-White interest rate framework. We used relevant S&P Dow Jones investment-grade corporate bond indices to measure the volatility of yields at different points along the yield curve. We selected the 10-year point on the yield curve to calibrate our stresses, based on our assumption of a 10-year duration for the liabilities of a typical life insurer. We used investment-grade corporate bond yields to reflect the typical investment-grade fixed-income portfolio of insurers.

We calibrated both up and down yield stresses and captured potential negative yields because we do not apply a floor. We grouped countries with similar volatility into five categories, calculated the average yield shock within each category, and rounded the result to determine our yield stresses (see table 16).

Table 16

Yield Stress Assumptions

(Basis points)	--Yield stress scenario--							
	--99.99%--		--99.95%--		--99.8%--		--99.5%--	
	Up	Down	Up	Down	Up	Down	Up	Down
Category 1	130	120	115	105	105	95	95	85
Category 2	180	170	160	150	145	135	135	120
Category 3	275	255	250	225	220	195	205	175
Category 4	365	330	330	290	295	250	270	225
Category 5	490	470	450	410	400	350	370	320

See table 41 in Appendix II, "Market Variables," for the full list of countries in each category.

For countries where there was insufficient data to calibrate yield volatility using a methodology consistent with the Hull-White interest rate framework, we used alternative methods to assess volatility, such as the historical VaR of investment-grade corporate bond index yields, and alternative data, such as the volatility of 10-year government bond yields. We used these alternative methods and data to benchmark relative volatility and assign countries to the risk categories (see table 41 in Appendix II, "Market Variables," for the full list of countries in each category).

To determine our standard duration mismatch assumptions for life insurers, we used analytical judgment informed by industry and regulatory data. We assign countries to one of six risk groups (see table 17) based on our analysis at a country level of duration mismatch, the level of guarantees in the liabilities, and the ability to share losses with policyholders (also known as the loss-absorbing capacity of technical provisions). See table 42 in Appendix II, "Market Variables," for the allocation of countries to duration mismatch groups.

Table 17

Duration Mismatch Assumptions (Life)

Group	Mismatch assumption (years)*
Group A	1
Group B	2
Group C	3
Group D	4

Table 17

Duration Mismatch Assumptions (Life) (cont.)

Group	Mismatch assumption (years)*
Group E	5
Group F	7

Note: See table 42 in Appendix II, "Market Variables," for the allocation of countries to duration mismatch groups. *For the purposes of these assumptions, we use years as a proxy for the duration after rounding to whole numbers. For example, we assume the duration for group b is 2%.

For non-life insurers, our standard assumption is that the duration mismatch is one-third of the mean term of an insurer's liabilities, subject to a floor of one year (for example, if the mean term of the non-life liabilities is 2.4 years, we apply a floor of one year, but if the mean term is 4.5 years, we assume a mismatch of 1.5 years).

The relevant category (for yield stress) is based on the currency of the liabilities. The group (for life duration mismatch) is usually the country or countries where the insurer writes a material amount of business. We may also allocate immaterial exposures to a category or group where the insurer writes a material amount of business. We use the currency of the liabilities for the yield stress, based on an assumption that assets and liabilities are currency matched (we capture foreign exchange risk in our insurance ratings framework; see "Related Criteria").

When we apply our standard assumptions for insurers writing foreign currency or cross-border business, we determine the relevant group as follows:

- If an insurer sells foreign currency products to domestic policyholders, we apply the duration mismatch assumption for the domestic market. For example, we apply the yield stress for the U.S. and duration mismatch assumption for Japan to the U.S. dollar-denominated domestic liabilities of an insurer based in Japan.
- If an insurer writes cross-border business, we apply the duration mismatch assumption based on the location of the risk. This assumes that the interest rate risk exposure is consistent with the location of the risk (that is, the insured). For example, we apply the yield stress for Polish zloty and duration mismatch assumption for Poland to the Polish zloty-denominated liabilities written in Poland by a German insurer.
- If an insurer is domiciled in a financial center, we typically apply the approach for cross-border business.

Where we determine the NCMV using duration mismatch, we determine the relevant exposure amount as follows:

Relevant non-life liabilities: The exposure amount reflects the reported non-life technical reserves by country and any non-life reserve adjustment we make in TAC (we may apply the adjustment proportionally). The exposure amount includes both outstanding claims and premium provisions (e.g., unearned premium reserve) and is net of non-life deferred acquisition costs. We also typically deduct premium receivables. Further, we adjust reported non-life technical reserves for any products that we have reclassified either from, or to, a life product risk.

Relevant life liabilities: The exposure amount reflects reported life technical reserves by country and any life reserve adjustment we make in TAC (we may apply the adjustment proportionally). We also exclude from the exposure amount any policyholder capital and unrealized gains on investments backing participating life business that we include in TAC, and the liabilities for

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products that are not in scope of this section of the criteria. We also adjust reported life technical reserves for any products that we have reclassified either from, or to, a non-life product risk.

Capital: To determine interest rate risk, we define capital as the excess, if any, of interest-sensitive assets over the sum of relevant life and non-life insurance liabilities (excluding, for the purposes of this calculation, any unit-linked assets and liabilities). This is based on either the amount of interest-sensitive assets that we determine are not backing relevant insurance liabilities or an estimate based on the assumption that interest-sensitive assets are held to back relevant insurance liabilities. We use the value of this excess as the relevant exposure amount. We include bonds, loans, and mortgages in interest-sensitive assets.

Where we determine the NCMV using duration mismatch, we assess the interest rate risk for three separate segments: life, non-life, and capital. For each segment, we calculate the interest rate risk for the relevant yield stress scenario, as follows:

- The interest rate risk for the life segment is the sum across all countries of the product of i) the relevant life liabilities, ii) the relevant yield stress for each country (we consider both up and down scenarios), and iii) the relevant duration mismatch assumption for each country (where we apply step 1 in chart 5, we apply the company-specific duration mismatch).
- The interest rate risk for the non-life segment is the sum across all currencies of the product of i) the relevant non-life liabilities, ii) the relevant yield stress for each currency (we consider both up and down scenarios), and iii) the duration mismatch assumption.
- The interest rate risk for the capital segment is the product of i) capital, if any; ii) the duration of the assets (or weighted average maturity of all bonds and loans, in the absence of duration) subject to a floor of one year, unless we are applying a company-specific duration mismatch under step 1 in chart 5; and iii) the relevant yield stress for the currency (we use only an up stress, unless we are applying a company-specific duration mismatch under step 1 in chart 5), which is typically the currency of the country of domicile. Where an insurer operates in a financial center, the relevant currency for the yield stress is the one we believe is most relevant for its operations (for example, where it writes most business).

We assume that yields in all currencies move in the same direction, either up or down. If the duration of assets is less than the duration of liabilities for the respective segment, we define the down yield stress as the most onerous for each of the life or non-life segments. Otherwise, the up yield stress is the most onerous.

Other Asset Risks

Exempt assets

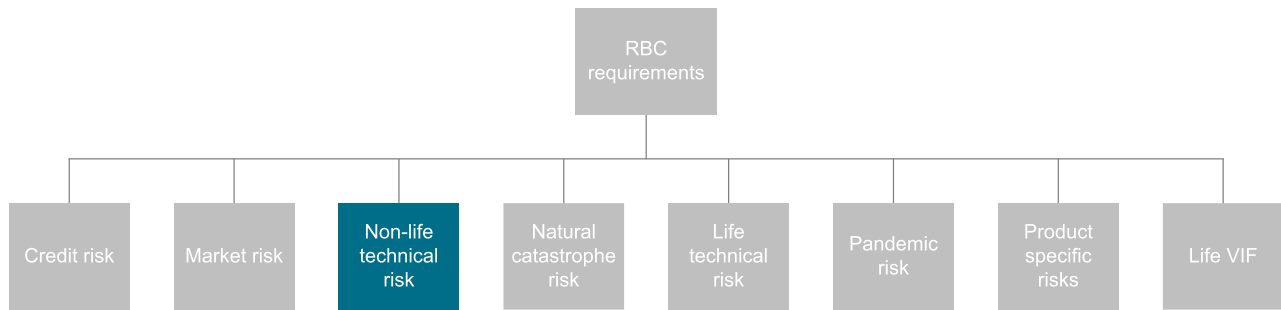
The following assets are exempt from credit, market, and other asset risk charges: non-life deferred acquisition costs, deferred tax assets, policy loans, investment income due, and accrued interest. We also typically consider exposures under repurchase agreements to be exempt assets, unless the collateral margin is insufficient, in our view, to mitigate risk in our stress scenarios.

Other assets

Other reported assets not captured in the credit or market risk charges or for which treatment is

otherwise not defined elsewhere in these criteria are typically subject to a 100% charge at each confidence level. The 100% risk charge recognizes the significant uncertainty over the realizable value of the asset in stress scenarios. This applies, for example, to fixed assets.

Non-Life Technical Risks



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The fundamental risk associated with underwriting and reserving is that in setting both the premium and reserve levels, the emergence of a claim and its actual cost will vary from the expected cost. These unexpected losses could result from higher-than-expected frequency and severity of claims, including the impact of changes in economic, legal, and social conditions. We apply capital charges to premiums and reserves to capture potential losses in stress scenarios from these non-life technical risks.

When an insurance line of business as reported by the industry is not explicitly addressed in our charges, we typically map to a line of business that is most representative of the insured exposure. If we determine this approach does not appropriately capture the risk, we may reclassify to an alternative line of business that is most representative of the risk.

Premium risk

We generally apply capital charges to non-life net written premiums (net of business ceded to reinsurers) to capture potential unexpected losses from higher-than-expected claims on business written in stress scenarios. We typically exclude the natural catastrophe premium from net written premiums when determining capital requirements for premium risk (see the section on natural catastrophe risk for more details).

We may use the net unearned premium reserve (or an equivalent) as the exposure base if this is higher than net written premiums (such as for insurers writing multiyear contracts).

The premium risk charge is a measure of pricing risk. We differentiate risk by product line and country or region, generally based on the location of the insured risk.

To determine the capital charges for primary insurance and proportional reinsurance business, we

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measured the volatility of loss ratios to determine stressed loss ratios at the 99.5% confidence level. We deducted the expected loss ratios to determine the unexpected loss ratios. We assume that premiums cover expected losses and that capital is needed to cover unexpected losses (as measured by the unexpected loss ratios).

We removed natural catastrophe losses from the data to avoid double-counting risk that is captured in our natural catastrophe risk charge.

We applied factors of 1.2x, 1.4x, and 1.65x relative to the results at the 99.5% confidence level to determine capital charges for each of the other confidence levels.

We used various data sources to measure the volatility of loss ratios in different jurisdictions. We also applied analytical judgment and rounding to determine the capital charges in 12 risk categories. We allocate each line of business in each country or region to one of these 12 risk categories based on our statistical analysis of loss ratio volatility, industry data, and regulatory capital charges (see table 18; also see the section on mortgage insurance).

We capture operational risks through our premium risk charges. For nonunderwritten U.S. health and disability ASO and ASCs, we apply a premium risk charge to capture these operational risks.

Table 18

Non-Life Premium Risk Charges (Primary And Proportional Reinsurance)

Category	--Capital charges--				
	99.99%	99.95%	99.80%	99.50%	
EMEA risks					
General liability	Liability	57.8	49.0	42.0	35.0
Workers' compensation	Liability	33.0	28.0	24.0	20.0
Fire and other damage to property	Property	33.0	28.0	24.0	20.0
Motor vehicle liability	Motor	33.0	28.0	24.0	20.0
Other motor	Motor	24.8	21.0	18.0	15.0
Credit and suretyship	Financial	49.5	42.0	36.0	30.0
Miscellaneous financial loss	Financial	57.8	49.0	42.0	35.0
Health and medical expense insurance	Health	16.5	14.0	12.0	10.0
Marine, aviation, and transport	MAT	66.0	56.0	48.0	40.0
Marine protection and indemnity§	MAT	49.5	42.0	36.0	30.0
Assistance	Other	41.3	35.0	30.0	25.0
Income protection	Other	33.0	28.0	24.0	20.0
Legal expense	Other	33.0	28.0	24.0	20.0
Other	Other	99.0	84.0	72.0	60.0
U.S. risks					
Excess workers' compensation	Liability	82.5	70.0	60.0	50.0
Medical malpractice - claims made	Liability	57.8	49.0	42.0	35.0
Medical malpractice - occurrence	Liability	82.5	70.0	60.0	50.0
Other liability - claims made	Liability	16.5	14.0	12.0	10.0
Other liability - occurrence	Liability	24.8	21.0	18.0	15.0
Product liability - claims made	Liability	57.8	49.0	42.0	35.0

Table 18

Non-Life Premium Risk Charges (Primary And Proportional Reinsurance) (cont.)

(%)	Category	--Capital charges--			
		99.99%	99.95%	99.80%	99.50%
Product liability - occurrence	Liability	33.0	28.0	24.0	20.0
Workers' compensation	Liability	24.8	21.0	18.0	15.0
Boiler and machinery	Property	41.3	35.0	30.0	25.0
Commercial multiperil	Property	24.8	21.0	18.0	15.0
Homeowner/farmowner multiperil	Property	41.3	35.0	30.0	25.0
Special property (fire, allied lines, inland marine, earthquake, burglary and theft)	Property	41.3	35.0	30.0	25.0
Auto physical damage	Motor	24.8	21.0	18.0	15.0
Commercial auto liability	Motor	24.8	21.0	18.0	15.0
Private passenger auto liability	Motor	24.8	21.0	18.0	15.0
Credit	Financial	49.5	42.0	36.0	30.0
Fidelity/surety	Financial	24.8	21.0	18.0	15.0
Financial guaranty	Financial	99.0	84.0	72.0	60.0
A&H stop-loss reinsurance	Health	41.3	35.0	30.0	25.0
Accident and health	Health	33.0	28.0	24.0	20.0
Administrative services only/administrative services contract*	Health	8.3	7.0	6.0	5.0
Full risk and experience rated group and individual health	Health	12.4	10.5	9.0	7.5
Dental and vision	Health	8.3	7.0	6.0	5.0
Federal employee health benefit program	Health	4.1	3.5	3.0	2.5
Hospital indemnity, accidental death and dismemberment, specified disease, and other limited benefits	Health	12.4	10.5	9.0	7.5
Medicare and Medicaid	Health	12.4	10.5	9.0	7.5
Medicare Part D (all other)	Health	16.5	14.0	12.0	10.0
Medicare Part D (risk corridor only)	Health	12.4	10.5	9.0	7.5
Medicare Part D (risk corridor and reinsurance)	Health	8.3	7.0	6.0	5.0
Medicare supplemental	Health	12.4	10.5	9.0	7.5
Other health	Health	16.5	14.0	12.0	10.0
Aircraft	MAT	66.0	56.0	48.0	40.0
Marine protection and indemnity§	MAT	49.5	42.0	36.0	30.0
Ocean marine	MAT	33.0	28.0	24.0	20.0
Title	Other	24.8	21.0	18.0	15.0
Warranty	Other	33.0	28.0	24.0	20.0
Other	Other	99.0	84.0	72.0	60.0

Table 18

Non-Life Premium Risk Charges (Primary And Proportional Reinsurance) (cont.)

(%)	Category	--Capital charges--			
		99.99%	99.95%	99.80%	99.50%
Canadian risks					
Liability	Liability	49.5	42.0	36.0	30.0
Boiler and machinery	Property	33.0	28.0	24.0	20.0
Commercial property	Property	33.0	28.0	24.0	20.0
Hail	Property	41.3	35.0	30.0	25.0
Personal property	Property	33.0	28.0	24.0	20.0
Auto - liability	Motor	33.0	28.0	24.0	20.0
Auto - other	Motor	33.0	28.0	24.0	20.0
Auto - personal accident	Motor	33.0	28.0	24.0	20.0
Credit	Financial	49.5	42.0	36.0	30.0
Credit protection	Financial	49.5	42.0	36.0	30.0
Fidelity	Financial	41.3	35.0	30.0	25.0
Surety	Financial	41.3	35.0	30.0	25.0
Accident and sickness (excluding supplementary health, disability income)†	Health	33.0	28.0	24.0	20.0
Supplementary health	Health	24.8	21.0	18.0	15.0
Aircraft	MAT	49.5	42.0	36.0	30.0
Marine	MAT	33.0	28.0	24.0	20.0
Marine protection and indemnity§	MAT	49.5	42.0	36.0	30.0
Legal expense	Other	49.5	42.0	36.0	30.0
Other approved products	Other	41.3	35.0	30.0	25.0
Title	Other	24.8	21.0	18.0	15.0
Warranty	Other	33.0	28.0	24.0	20.0
Other	Other	99.0	84.0	72.0	60.0
Asia-Pacific risks					
Employers' liability	Liability	24.8	21.0	18.0	15.0
General liability	Liability	33.0	28.0	24.0	20.0
Professional indemnity	Liability	33.0	28.0	24.0	20.0
Public and product liability	Liability	41.3	35.0	30.0	25.0
Commercial property	Property	33.0	28.0	24.0	20.0
Domestic property	Property	33.0	28.0	24.0	20.0
Engineering	Property	49.5	42.0	36.0	30.0
Commercial motor - Australia and New Zealand	Motor	16.5	14.0	12.0	10.0
Domestic motor - Australia and New Zealand	Motor	12.4	10.5	9.0	7.5
Motor - all inclusive	Motor	33.0	28.0	24.0	20.0
Motor - Japan and Taiwan	Motor	16.5	14.0	12.0	10.0

Table 18

Non-Life Premium Risk Charges (Primary And Proportional Reinsurance) (cont.)

(%)	Category	--Capital charges--			
		99.99%	99.95%	99.80%	99.50%
Third-party liability motor	Motor	33.0	28.0	24.0	20.0
Consumer credit	Financial	24.8	21.0	18.0	15.0
Credit	Financial	82.5	70.0	60.0	50.0
Accident and health	Health	16.5	14.0	12.0	10.0
Health	Health	12.4	10.5	9.0	7.5
Marine, aviation - cargo	MAT	33.0	28.0	24.0	20.0
Marine, aviation - hull	MAT	66.0	56.0	48.0	40.0
Marine protection and indemnity§	MAT	49.5	42.0	36.0	30.0
Travel	Other	24.8	21.0	18.0	15.0
Other	Other	99.0	84.0	72.0	60.0
Latin American risks					
Employers' liability	Liability	33.0	28.0	24.0	20.0
General liability	Liability	33.0	28.0	24.0	20.0
Professional indemnity	Liability	49.5	42.0	36.0	30.0
Commercial property	Property	99.0	84.0	72.0	60.0
Domestic property	Property	41.3	35.0	30.0	25.0
Mexico farm and ranch	Property	99.0	84.0	72.0	60.0
Property all inclusive	Property	41.3	35.0	30.0	25.0
Motor all inclusive	Motor	16.5	14.0	12.0	10.0
Credit	Financial	82.5	70.0	60.0	50.0
Fidelity	Financial	66.0	56.0	48.0	40.0
Surety	Financial	82.5	70.0	60.0	50.0
Accident and health	Health	33.0	28.0	24.0	20.0
Health and medical exp	Health	12.4	10.5	9.0	7.5
Marine, aviation - all inclusive	MAT	99.0	84.0	72.0	60.0
Marine, aviation - cargo	MAT	33.0	28.0	24.0	20.0
Marine protection and indemnity§	MAT	49.5	42.0	36.0	30.0
Travel	Other	41.3	35.0	30.0	25.0
Warranty	Other	8.3	7.0	6.0	5.0
Other	Other	99.0	84.0	72.0	60.0

Notes: We typically apply the capital charges to net written premiums. We may use the net unearned premium reserve (UPR) (or equivalent) if this is higher. Where we do not have a split of the UPR by line of business, we may use the breakdown by premiums and apply these proportions to the UPR. The category is used to group lines of business in the diversification calculation. *Applied to administrative expenses for health and disability ASO/ASC arrangements. §Applicable when this business line with a globally consistent charge is material, as is typically the case for members of marine mutual clubs. †Disability income is included in the relevant life disability product category. MAT--Marine, aviation, and transport.

We apply 1.25x the charges in table 18 (rounded to one decimal place) to determine capital

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requirements for nonproportional reinsurance business in all lines and all countries and regions. We apply this surcharge to capture the higher volatility of unexpected losses that we observe for nonproportional reinsurance business.

Reserve risk

We apply capital charges to adjusted non-life net loss reserves (see glossary) to capture potential unexpected losses from higher-than-expected incurred claims in stress scenarios. The reserve risk charge is a measure of the risk that balance-sheet loss reserves will become deficient due to unexpected variability in estimating frequency and severity trends, as well as due to changes in economic, legal, and social conditions that can add variability to claim costs. The reserve risk charge is not a measure of the adequacy of current loss reserves. We differentiate risk by product line and country or region, generally based on the location of the insured risk.

To determine the capital charges, we used accepted actuarial techniques to measure the potential volatility in the development of incurred claims over one year at the 99.5% confidence level. We assume that expected incurred claims are covered by loss reserves and that capital is needed to cover unexpected incurred claims. We applied factors of 1.2x, 1.4x, and 1.65x relative to the results at the 99.5% confidence level to determine capital charges for each of the other confidence levels.

We used U.S. statutory data as a starting point, given its public availability on an accident year basis. We applied an adjustment to the results based on the proportion of reserves relating to the latest accident year to avoid any double counting with our premium risk charges. Finally, we applied analytical judgment, incorporating our analysis of industry data and regulatory capital charges, and rounding to determine the capital charges by line of business for each country or region (see table 19).

Table 19

Non-Life Reserve Risk Charges (Primary And Proportional Reinsurance)

(%)	Category	--Capital charges--			
		99.99%	99.95%	99.80%	99.50%
EMEA risks					
General liability	Liability	33.0	28.0	24.0	20.0
Workers' compensation	Liability	33.0	28.0	24.0	20.0
Fire and other damage to property	Property	33.0	28.0	24.0	20.0
Motor vehicle liability	Motor	33.0	28.0	24.0	20.0
Other motor	Motor	24.8	21.0	18.0	15.0
Credit and suretyship	Financial	66.0	56.0	48.0	40.0
Miscellaneous financial loss	Financial	66.0	56.0	48.0	40.0
Health and medical expense insurance	Health	16.5	14.0	12.0	10.0
Marine, aviation, and transport	MAT	41.3	35.0	30.0	25.0
Marine protection and indemnity†	MAT	41.3	35.0	30.0	25.0
Assistance	Other	66.0	56.0	48.0	40.0
Income protection	Other	41.3	35.0	30.0	25.0
Legal expense	Other	41.3	35.0	30.0	25.0

Table 19

Non-Life Reserve Risk Charges (Primary And Proportional Reinsurance) (cont.)

(%)	Category	--Capital charges--			
		99.99%	99.95%	99.80%	99.50%
Other	Other	66.0	56.0	48.0	40.0
U.S. risks					
Medical malpractice - claims made	Liability	49.5	42.0	36.0	30.0
Medical malpractice - occurrence	Liability	57.8	49.0	42.0	35.0
Other liability - claims made	Liability	41.3	35.0	30.0	25.0
Other liability - occurrence*	Liability	49.5	42.0	36.0	30.0
Product liability - claims made	Liability	41.3	35.0	30.0	25.0
Product liability - occurrence	Liability	49.5	42.0	36.0	30.0
Workers' compensation	Liability	24.8	21.0	18.0	15.0
Boiler and machinery	Property	49.5	42.0	36.0	30.0
Commercial multiperil	Property	41.3	35.0	30.0	25.0
Homeowner/farmowner multiperil	Property	33.0	28.0	24.0	20.0
Special property (fire, allied lines, inland marine, earthquake, burglary and theft)	Property	41.3	35.0	30.0	25.0
Auto physical damage	Motor	24.8	21.0	18.0	15.0
Commercial auto liability	Motor	33.0	28.0	24.0	20.0
Private passenger auto liability	Motor	24.8	21.0	18.0	15.0
Credit	Financial	41.3	35.0	30.0	25.0
Fidelity/surety	Financial	41.3	35.0	30.0	25.0
Financial guaranty	Financial	41.3	35.0	30.0	25.0
Accident and health§	Health	41.3	35.0	30.0	25.0
U.S. health reserves	Health	8.3	7.0	6.0	5.0
Aircraft	MAT	49.5	42.0	36.0	30.0
Marine protection and indemnity†	MAT	41.3	35.0	30.0	25.0
Ocean marine	MAT	49.5	42.0	36.0	30.0
Title	Other	33.0	28.0	24.0	20.0
Warranty	Other	41.3	35.0	30.0	25.0
Other	Other	66.0	56.0	48.0	40.0
Canadian risks					
Liability	Liability	57.8	49.0	42.0	35.0
Boiler and machinery	Property	33.0	28.0	24.0	20.0
Commercial property	Property	41.3	35.0	30.0	25.0
Hail	Property	41.3	35.0	30.0	25.0
Personal property	Property	33.0	28.0	24.0	20.0
Auto - liability	Motor	24.8	21.0	18.0	15.0
Auto - other	Motor	24.8	21.0	18.0	15.0

Table 19

Non-Life Reserve Risk Charges (Primary And Proportional Reinsurance) (cont.)

(%)	Category	--Capital charges--			
		99.99%	99.95%	99.80%	99.50%
Auto - personal accident	Motor	24.8	21.0	18.0	15.0
Credit	Financial	33.0	28.0	24.0	20.0
Credit protection	Financial	33.0	28.0	24.0	20.0
Fidelity	Financial	41.3	35.0	30.0	25.0
Surety	Financial	41.3	35.0	30.0	25.0
Accident and sickness (excluding supplementary health, disability income)**	Health	41.3	35.0	30.0	25.0
Supplementary health	Health	8.3	7.0	6.0	5.0
Aircraft	MAT	49.5	42.0	36.0	30.0
Marine	MAT	49.5	42.0	36.0	30.0
Marine protection and indemnity†	MAT	41.3	35.0	30.0	25.0
Legal expense	Other	57.8	49.0	42.0	35.0
Other approved products	Other	41.3	35.0	30.0	25.0
Title	Other	33.0	28.0	24.0	20.0
Warranty	Other	41.3	35.0	30.0	25.0
Other	Other	66.0	56.0	48.0	40.0
Asia-Pacific risks					
Employers' liability	Liability	33.0	28.0	24.0	20.0
General liability	Liability	33.0	28.0	24.0	20.0
Professional indemnity	Liability	33.0	28.0	24.0	20.0
Public and product liability	Liability	41.3	35.0	30.0	25.0
Commercial property	Property	33.0	28.0	24.0	20.0
Domestic property	Property	33.0	28.0	24.0	20.0
Engineering	Property	49.5	42.0	36.0	30.0
Commercial motor – Australia and New Zealand	Motor	16.5	14.0	12.0	10.0
Domestic motor - Australia and New Zealand	Motor	16.5	14.0	12.0	10.0
Motor - all inclusive	Motor	24.8	21.0	18.0	15.0
Motor - Japan and Taiwan	Motor	16.5	14.0	12.0	10.0
Third-party liability motor	Motor	33.0	28.0	24.0	20.0
Consumer credit	Financial	24.8	21.0	18.0	15.0
Credit	Financial	49.5	42.0	36.0	30.0
Accident and health	Health	16.5	14.0	12.0	10.0
Health	Health	12.4	10.5	9.0	7.5
Marine, aviation - cargo	MAT	33.0	28.0	24.0	20.0
Marine, aviation - hull	MAT	49.5	42.0	36.0	30.0
Marine protection and indemnity†	MAT	41.3	35.0	30.0	25.0

Table 19

Non-Life Reserve Risk Charges (Primary And Proportional Reinsurance) (cont.)

(%)	Category	--Capital charges--			
		99.99%	99.95%	99.80%	99.50%
Travel	Other	24.8	21.0	18.0	15.0
Other	Other	66.0	56.0	48.0	40.0
Latin American risks					
Employers' liability	Liability	33.0	28.0	24.0	20.0
General liability	Liability	33.0	28.0	24.0	20.0
Professional indemnity	Liability	49.5	42.0	36.0	30.0
Commercial property	Property	41.3	35.0	30.0	25.0
Domestic property	Property	33.0	28.0	24.0	20.0
Mexico farm and ranch	Property	66.0	56.0	48.0	40.0
Property all inclusive	Property	41.3	35.0	30.0	25.0
Motor all inclusive	Motor	24.8	21.0	18.0	15.0
Credit	Financial	49.5	42.0	36.0	30.0
Fidelity	Financial	49.5	42.0	36.0	30.0
Surety	Financial	49.5	42.0	36.0	30.0
Accident and health	Health	33.0	28.0	24.0	20.0
Health and medical exp	Health	12.4	10.5	9.0	7.5
Marine aviation - all inclusive	MAT	41.3	35.0	30.0	25.0
Marine aviation - cargo	MAT	41.3	35.0	30.0	25.0
Marine protection and indemnity†	MAT	41.3	35.0	30.0	25.0
Travel	Other	33.0	28.0	24.0	20.0
Warranty	Other	41.3	35.0	30.0	25.0
Other	Other	66.0	56.0	48.0	40.0

Notes: The capital charges are applied to adjusted net loss reserves (see glossary). The category is used to group lines of business in the diversification calculation. *Includes excess workers' compensation. §Includes A&H stop-loss reinsurance. †Applicable when this business line with a globally consistent charge is material, as is typically the case for members of marine mutual clubs. **Disability income is included in the relevant life disability product category. MAT--Marine, aviation, and transport.

We apply 1.25x the charges in table 19 (rounded to one decimal place) to determine capital requirements for nonproportional reinsurance business in all lines and all countries and regions. This reflects our opinion that reserve volatility is higher for nonproportional reinsurance business owing to factors such as delays in receiving timely claims information to estimate reserves.

Mortgage insurance

Where we determine that mortgage insurance is material, we apply the capital charges in this section to determine mortgage insurance capital requirements.

We apply capital charges to net written premiums and/or net unearned premium reserves (or an equivalent), depending on premium payment frequency, to capture potential unexpected losses

from higher-than-expected default frequency in stress scenarios. For these purposes, net unearned premium reserve is the unearned premiums less outward reinsurance expense, and the liability for remaining coverage is treated the same as unearned premium reserve.

Our capital charges are informed by potential unexpected losses that could emerge over three years to capture the full impact of the stress. Our capital charges assume a highly diverse portfolio.

To determine the capital charges, we measured the volatility of default frequency and loss severity (based on house price declines) under economic stresses to determine loss rates at the different confidence levels. We then converted this into a percentage of premiums, incorporating the benefit of reinsurance. We primarily used U.S. mortgage market data, specifically the government-sponsored enterprises loan data, to measure default frequency, and the Federal Housing Finance Agency's Purchase Only House Price Index to measure house price volatility. We applied analytical judgment and rounding to determine the capital charges.

We also apply capital charges to reserves to capture potential unexpected losses from higher-than-expected incurred claims in stress scenarios. We use the same methodology for reserve risk that we applied to other non-life business lines.

Determining Mortgage Insurance Capital Requirements

To determine capital requirements, we apply the following steps:

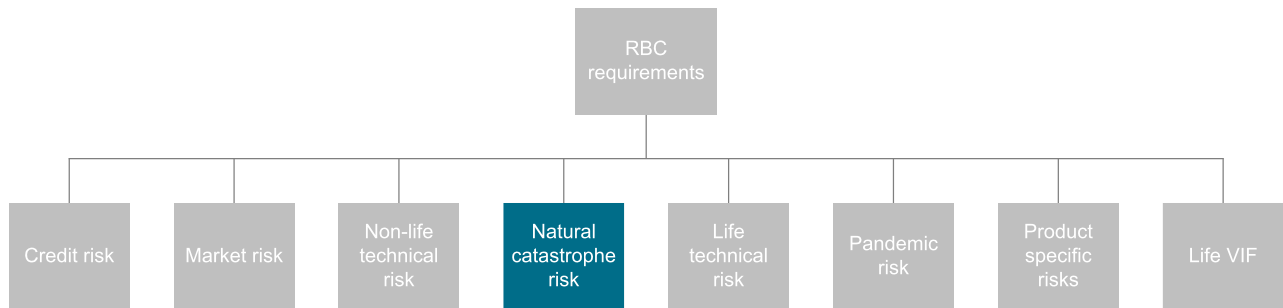
- The premium risk capital requirement is the product of i) the premium risk factor in table 20 and ii) the sum of net written premiums for recurring premium business (typically for monthly payments) and 20% of the net unearned premium reserve (or similar exposure measure) for single or upfront premium business. In the absence of net written premiums and the net unearned premium reserve (or an equivalent), we may use 100% of net earned premium as our measure of exposure where we consider this appropriate.
- The reserve risk capital requirement is the product of net loss reserves and the capital charges in table 20.
- We apply a factor of 1.25x to the charges in table 20 for nonproportional business (rounded to one decimal place).

Table 20

Mortgage Insurance Capital Charges (Primary And Proportional Reinsurance)

(%)	--Capital charges--			
	99.99%	99.95%	99.8%	99.5%
Premium risk factor	425.0	310.0	217.0	125.0
Reserve risk	41.3	35.0	30.0	25.0

Natural Catastrophe Risk



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Where we determine that natural catastrophe risk for non-life exposures is material, we include capital charges to capture potential unexpected losses from natural catastrophes. The capital charge at the 99.5% confidence level is based on the pretax aggregate one-in-200-year loss estimate from natural disasters across all lines of business.

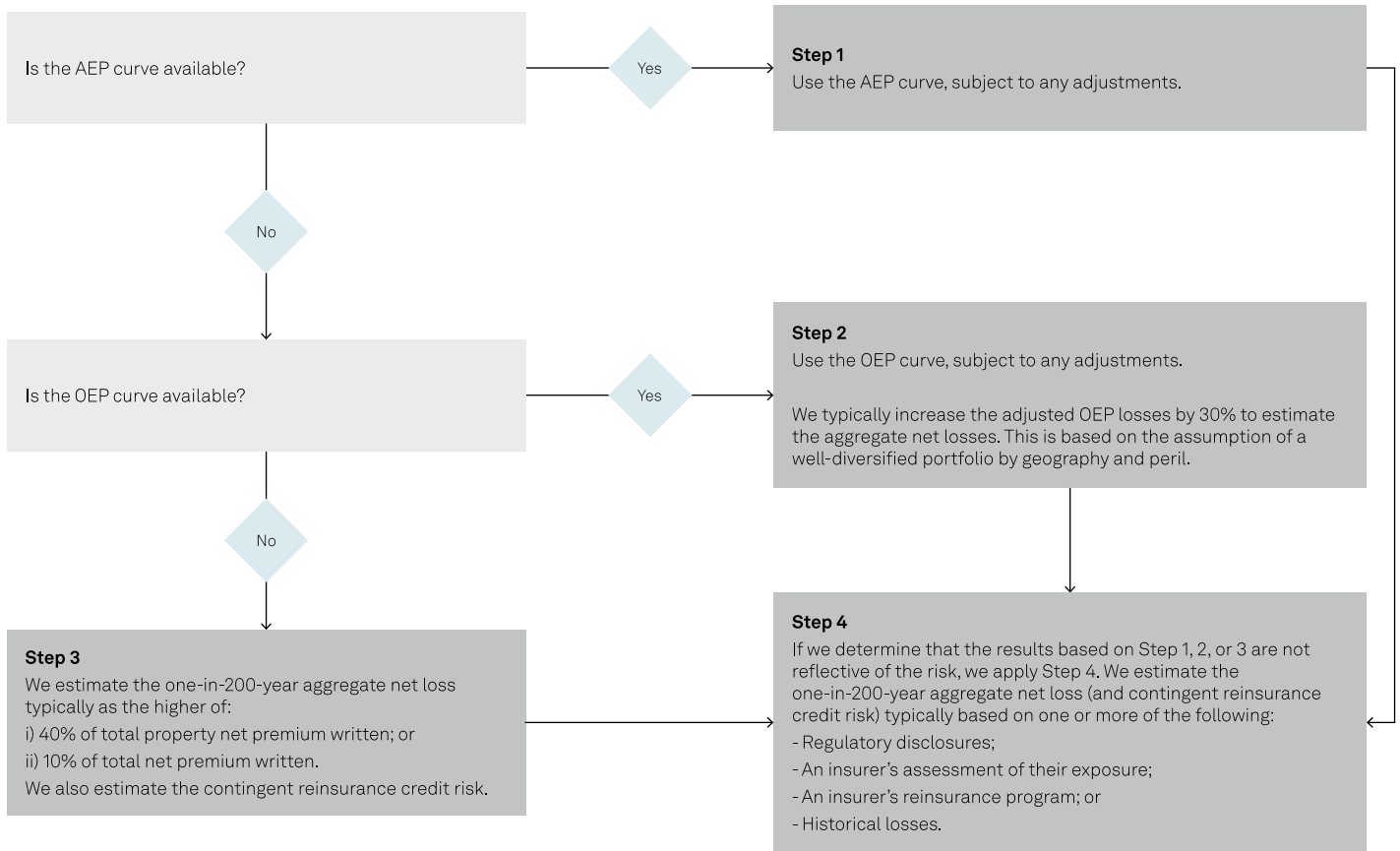
The loss estimate is calculated net of reinsurance and other forms of mitigation, such as catastrophe bonds, and captures inward and outward reinstatement premiums. We expect the loss estimate to include demand surge, fire following (attached to earthquake and fire policies), sprinkler leakage, storm surge, and secondary uncertainty losses.

The capital charge covers exposures to global natural disasters including hurricanes (wind), flood, earthquake, tornadoes, winter storms (extratropical cyclones), wildfire, and hail. We expect the loss estimate to capture an insurer's expected exposure over the next year. We include in the loss estimate all investments and exposures to natural catastrophe risk, such as investments by the insurer in catastrophe bonds.

We determine the net aggregate loss estimate based on the steps in chart 6:

Chart 6

Determining the net aggregate loss estimate



AEP--Aggregate exceedance probability. OEP--Occurrence exceedance probability.
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Determining The Natural Catastrophe Risk Charge

We use the results from catastrophe models to derive the AEP or OEP curves. Where an insurer includes a loading on top of the output from catastrophe models, we include the loading to determine the loss estimate. Where we determine that the output from catastrophe models, including any loadings, does not adequately capture the risk (for example, relating to demand surge, secondary uncertainty, or climate change), we apply adjustments to determine the relevant loss estimate.

For steps 1 and 2, we deduct catastrophe-related premium from the loss estimate to determine the stressed natural catastrophe underwriting losses. The premium we deduct is equivalent to the premium related to catastrophe business excluding the amount relating to expenses. We define catastrophe-related premium as follows, although we may adjust our calculation when there is catastrophe-related premium information that is subject to an independent third-party review (such as by an auditor or regulator):

$$(1 - \text{industry average expense ratio}) * \left(\frac{\text{Aggregate annual average loss}}{\text{Industry average catastrophe loss ratio}} \right)$$

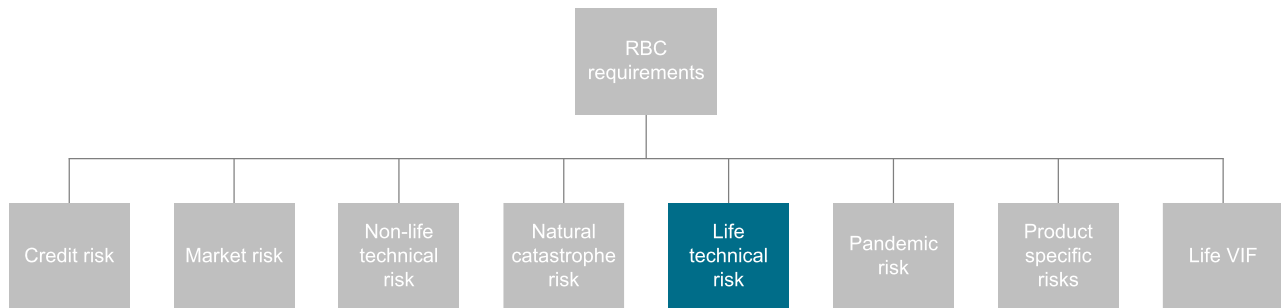
The net aggregate annual average loss is specific to the insurer's exposure and typically based on the output from catastrophe models. Our assumptions for the industry average catastrophe loss and expense ratios are based on our analysis of market data (see Appendix II, "Market Variables," for the industry average catastrophe loss and expense ratio assumptions). For step 3, the catastrophe-related premium is implicitly captured in our assumptions. For step 4, we assume the catastrophe-related premium is captured.

When we apply step 1 or step 2, we usually exclude the natural catastrophe premium (before the expense adjustment) from net written premiums when determining capital requirements for premium risk.

Where we apply step 1 or step 2, the capital charge at the 99.99% confidence level is based on the net aggregate one-in-500-year loss estimate. Similarly, the 99.8% and 99.95% confidence levels are based on the one-in-250-year and one-in-333-year net loss estimates. When the one-in-250-year and/or one-in-333-year net loss estimates are not available, we use interpolation to determine the capital charges at the 99.8% and/or 99.95% confidence levels. The interpolation is based on relative distances between the relevant scaling factors--namely, 1.0x, 1.2x, 1.4x, and 1.65x for each of the confidence levels. Where we apply step 3 or step 4, we apply these same scaling factors directly to the one-in-200-year net aggregate loss to determine the capital charges at the 99.8%, 99.95%, and 99.99% confidence levels, respectively.

If we determine that natural catastrophe risk is immaterial such that any residual risk is sufficiently captured in our premium risk charges, we may exclude the natural catastrophe risk from our capital requirements and apply our premium risk charges to total net written premiums (that is, with no deduction for the natural catastrophe premium).

Life Technical Risks



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A fundamental risk in pricing life insurance products is that the experience relating to mortality, morbidity, longevity, expense, and lapse could be worse than the assumptions built into the products. We apply capital charges to the relevant exposures to capture potential losses in stress scenarios from these life technical risks.

Mortality

We apply capital charges to the net amount at risk (NAR, or net sums at risk, which is net of amounts ceded to reinsurers) on life products to capture the potential losses from higher-than-expected mortality in stress scenarios. These unexpected losses could stem from volatility in the level of mortality rates, volatility around the trend, and misestimation of mortality at policy inception. We differentiate risk based on the size of the NAR and the extent of development of the life insurance market where the insurer writes business.

To determine the capital charges, we measured the volatility of actual mortality relative to expected mortality (the actual-to-expected-mortality ratio) since 1996 for the top 200 U.S. life companies and translated that into a percentage of the NAR. The actual-to-expected ratios were much less volatile for companies with larger NARs, reflecting the benefits of risk diversification.

We segmented the insurers into three NAR groups where we observed significant differences in volatility, to explicitly capture this diversification. We calibrated this volatility to our stress scenarios based on a normal distribution to determine the charges at each confidence level for the three NAR groups.

For the purposes of the mortality and morbidity risk charges in these criteria, we classify life markets as highly developed or less developed based on several factors, such as life insurance penetration, annual life premiums, income group, and life expectancy (see Appendix II, "Market Variables," for the classification of life markets). Table 21 shows the capital charges we apply in highly developed life markets. We apply the charges in table 22 to less developed life markets. These charges are about 25% higher than the charges we apply in highly developed life markets.

Table 21

Mortality Risk Capital Charges (Highly Developed Life Markets)

Net amount at risk	--Capital charges--			
	99.99%	99.95%	99.8%	99.5%
First \$50 billion	0.251	0.222	0.194	0.174
Next \$200 billion	0.154	0.136	0.119	0.107
Amount in excess of \$250 billion	0.057	0.050	0.044	0.039

Table 22

Mortality Risk Capital Charges (Less Developed Life Markets)

Net amount at risk	--Capital charges--			
	99.99%	99.95%	99.8%	99.5%
First \$50 billion	0.313	0.277	0.242	0.217
Next \$200 billion	0.193	0.171	0.149	0.133
Amount in excess of \$250 billion	0.071	0.063	0.055	0.049

Morbidity risk--critical illness

We apply capital charges to the NAR on critical illness products with predetermined and fixed payments upon incident (e.g., lump sum payments) to capture the potential losses from higher-than-expected morbidity inception rates in stress scenarios. These unexpected losses could stem from volatility in the level of morbidity rates, volatility around the trend, and misestimation of morbidity at policy inception.

We differentiate risk based on the size of the NAR and the extent of development of the life insurance market where the insurer writes business. We apply the relevant non-life charges to critical illness products with variable payments upon incident (e.g., indemnity or reimbursement critical illness insurance).

To determine the capital charges, we applied stress factors to the inception rates of critical illness claims. Our analysis indicated that stressed critical illness losses exceeded the stressed mortality losses by a factor of just over 2x. Therefore, we apply this factor to the mortality capital charges based on the same NAR groupings and segmentation of the development of the life insurance market.

In addition to applying the charges to stand-alone critical illness products, where critical illness coverage is offered as a rider to a base life insurance policy (for example, where it provides for an acceleration in the payment of the life insurance benefit), we apply the critical illness charges to these products, given it is the dominant risk and should incorporate the mortality-related volatility (see tables 23 and 24). However, if the critical illness and life insurance benefit amounts in a single policy are different--and we can split the NAR--we may apply separate mortality and morbidity charges to the respective NAR.

Table 23

Morbidity Risk Capital Charges - Critical Illness (Highly Developed Life Markets)

(%)	--Capital charges--			
Net amount at risk	99.99%	99.95%	99.8%	99.5%
First \$50 billion	0.54	0.47	0.42	0.37
Next \$200 billion	0.33	0.29	0.26	0.23
Amount in excess of \$250 billion	0.12	0.11	0.09	0.08

Table 24

Morbidity Risk Capital Charges - Critical Illness (Less Developed Life Markets)

(%)	--Capital charges--			
Net amount at risk	99.99%	99.95%	99.8%	99.5%
First \$50 billion	0.67	0.59	0.52	0.46
Next \$200 billion	0.41	0.37	0.32	0.29
Amount in excess of \$250 billion	0.15	0.13	0.12	0.11

Morbidity risk--disability

We apply capital charges to long-term disability products (also known as income protection or permanent health insurance) to capture the potential losses from higher-than-expected morbidity inception rates and lower-than-expected recovery rates in stress scenarios. These unexpected losses could stem from volatility in the level of morbidity rates, volatility around the trend, and misestimation of morbidity at policy inception.

We differentiate risk based on product type and premium size. We apply premium-based charges to capture pricing risk relating to inception and recovery rate volatility. We also apply reserve-based charges to capture recovery rate volatility or claims termination risk (see table 25). We do not apply these charges to long-term care products or long-term health business with aging reserves (see the relevant sections for the charges on these products).

The U.S. regulatory RBC factors, together with our analysis of loss ratio volatility, inform our capital charges. We increase the RBC factors by 40%-67%, based on our analysis of potential losses in stress scenarios. We assume a normal distribution to determine the charges at each confidence level. Our analysis indicates loss ratios are much less volatile for companies with larger premium volumes. We reflect this risk diversification benefit by segmenting capital charges based on premium size.

Table 25

Morbidity Risk Capital Charges - Disability

(%)	--Capital charges--			
	99.99%	99.95%	99.8%	99.5%
PREMIUM RISK CHARGES*				
Noncancelable disability income				
First \$50 million	72.0	64.0	56.0	50.0
Amount in excess of \$50 million	30.2	26.9	23.5	21.0
Other individual income				
First \$50 million	50.4	44.8	39.2	35.0
Amount in excess of \$50 million	14.4	12.8	11.2	10.0
Group long-term				
First \$50 million	30.2	26.9	23.5	21.0
Amount in excess of \$50 million	7.2	6.4	5.6	5.0
Group short-term				
First \$50 million	10.1	9.0	7.8	7.0
Amount in excess of \$50 million	7.2	6.4	5.6	5.0
Credit monthly outstanding balance				
First \$50 million	40.3	35.8	31.4	28.0
Amount in excess of \$50 million	7.2	6.4	5.6	5.0
Credit single premium with UPR				
First \$50 million	25.9	23.0	20.2	18.0
Amount in excess of \$50 million	7.2	6.4	5.6	5.0
Credit single premium without UPR				
First \$50 million	25.9	23.0	20.2	18.0
Amount in excess of \$50 million	7.2	6.4	5.6	5.0
Other disability income				
First \$50 million	50.4	44.8	39.2	35.0
Amount in excess of \$50 million	14.4	12.8	11.2	10.0
RESERVE RISK CHARGE§				
Total disability claims reserves	13.7	12.2	10.7	9.6

Note: Where we do not have a split by product, we typically assume products are noncancelable disability income. *Applied to net earned premiums (or net written premiums in the absence of earned premium). §Applied to claims reserves. UPR--Unearned premium reserve.

Morbidity risk--long-term care

We apply capital charges to long-term care products to capture the potential losses from higher-than-expected morbidity inception rates and lower-than-expected claims termination rates in stress scenarios. These unexpected losses could stem from volatility in the level of morbidity rates, volatility around the trend, misestimation of morbidity at policy inception, and lower-than-expected mortality.

In the U.S., we apply premium- and claims-based charges to capture pricing risk relating to inception and claims termination rate volatility. We also apply reserve-based charges to capture claims termination risk, in addition to expense and operational risks (see table 26). In other countries, we capture all these risks through a single liability-based charge.

The U.S. regulatory RBC factors, together with our analysis of loss ratio volatility, inform our capital charges. We increase the average premium and claims-based RBC factors, after scaling to our confidence level, by a factor of about 2.5x based on our analysis of potential losses in stress scenarios. We increase the reserve-based RBC factors by about 60% to align with our confidence level. We assume a normal distribution to determine the charges at each confidence level.

Table 26

Morbidity Risk - Long-Term Care

(%)	--Capital charges--			
	99.99%	99.95%	99.8%	99.5%
U.S.				
Earned premiums	46	41	36	32
Claims*	118	105	91	82
Claims reserves§	14	13	11	10
Non-U.S.				
Liabilities	25	22	19	17

*Claims are calculated by taking an average of the current- and prior-year loss ratios (incurred claims divided by earned premiums) and multiplying that ratio by the current year's earned premium. In situations where there is no positive earned premium or one of the loss ratios is negative, actual incurred claims for the current year are used. Incurred claims are defined as paid claims plus the change in claim reserves during a calendar year. §Reserves for policyholders currently collecting benefits.

Longevity risk

We apply capital charges to the net present value of future claims payments (e.g., reported reserves) on life products that are exposed to longevity risk to capture the potential losses from lower-than-expected mortality in stress scenarios (see table 27). These unexpected losses could stem from volatility in the level of mortality rates, volatility around the trend, and misestimation of mortality at policy inception. We differentiate risk based on our assumptions about the extent of the longevity risk embedded in different annuity-type products.

To determine the capital charges, we measured the volatility of mortality improvements in various countries where there was sufficient long-term mortality data and where longevity risk represents a significant exposure for insurers. The primary source we used for long-term mortality data was the Human Mortality Database (see "Related Research"). We also applied analytical judgment in determining the final charges, including benchmarking with regulatory capital charges. We assumed a normal distribution to determine the charges at each confidence level.

Where we determine that reported reserves for products exposed to longevity risk are significantly in excess of the best estimate, we reduce the charges in table 27. The assessment of reserve adequacy is typically based on the stated minimum reserving level under the relevant accounting or regulatory standards but may also reflect our determination based on a company's reserving policy and independent audit reports. The reduction we apply varies based on the confidence level of the reported reserves:

- 90% or higher--45% reduction in charges

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- At least 80% but less than 90%--35% reduction in charges
- At least 70% but less than 80%--25% reduction in charges
- Less than 70%: 0% reduction in charges

The allocation of products to categories 1, 2, or 3 is based on the longevity risk embedded within the product:

- We include products with the highest longevity risk in category 1. These are usually products with no or limited lump-sum optionality for policyholders (for example, immediate payout annuities).
- We include in category 3 products for which we determine there is immaterial longevity risk. These are usually products with limited and economically unattractive annuitization options for policyholders.
- We include all other products in category 2. Products in category 2 typically offer economically attractive annuitization options for policyholders even though a material proportion of policyholders do not annuitize. To develop the capital charges for products in category 2, we assume 30% of policyholders annuitize (equivalent to applying the full longevity risk charge from category 1 to 30% of the liabilities in category 2).

Table 27

Longevity Risk Capital Charges

(%)	--Capital charges--			
	99.99%	99.95%	99.8%	99.5%
Category 1	7.9	7.0	6.1	5.5
Category 2	2.4	2.1	1.8	1.7
Category 3	0.0	0.0	0.0	0.0

We apply the capital charges to the net present value of future claims payments. The exposure is net of the reinsurers' share of the net present value of future claims payments. For life contingent products where the premium is paid upfront, we typically use the reserve (or liability) as our measure of exposure. For products where the premium is not paid upfront (e.g., longevity swaps), we typically use the floating leg benefit payments as our measure of exposure.

Other life technical risks

We apply capital charges to life liabilities to capture potential losses from a permanent change in lapse rate assumptions, a mass lapse event, a permanent change in expense assumptions, and potential operational risk losses (see table 28). We differentiate risk based on our assumptions about the extent of lapse risk in different products.

To develop the capital charges, we applied analytical judgment informed by regulatory calibrations and industry data. We assumed a log-normal distribution to determine the charges at each confidence level.

We include in category 3 products with no lapse option (such as immediate payout annuities), products with no surrender value (such as term life insurance or disability), and products with no risk of investment losses for the insurer on lapse (such as unit-linked contracts where the policyholder bears all the investment risk).

Products in categories 1 and 2 typically have a surrender value and expose the insurer to potential

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investment losses on lapse. We include in category 1 products that have investment guarantees. We include all other products in category 2. All references in this section to lapses include surrender and withdrawals.

We may reallocate exposures by at most one risk category where there are material risk-mitigating features embedded in the products that significantly reduce the financial impact of lapses for the insurer. For example, we may reallocate products to category 2 from category 1 where we believe the insurer has the willingness and ability to apply surrender charges or market-value adjustments to significantly reduce its potential investment losses on lapse.

We may also split the exposure on products that we include in category 1 or 2 where a proportion of the exposure is not exposed to lapse risk. We allocate this proportion of the exposure to category 3.

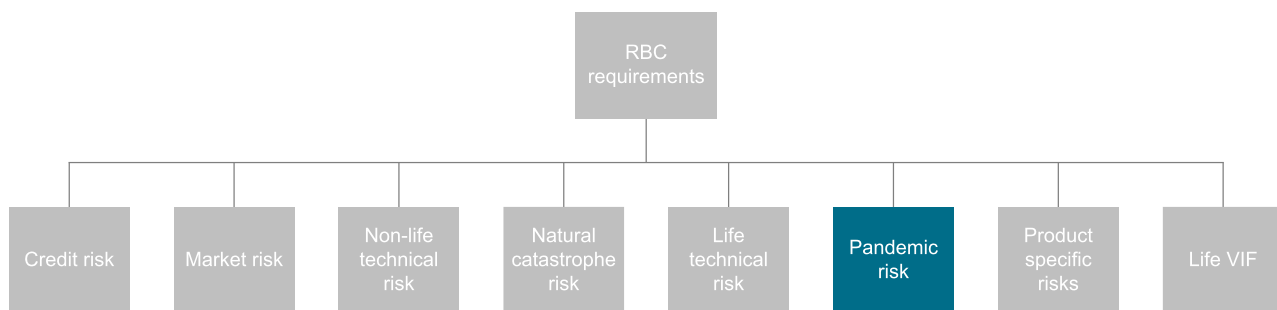
Table 28

Other Life Technical Risk Capital Charges

(%)	--Capital charges--			
	99.99%	99.95%	99.8%	99.5%
Category 1	2.3	2.0	1.7	1.4
Category 2	1.2	1.0	0.9	0.7
Category 3	0.7	0.6	0.5	0.4

We apply the capital charges to reported life liabilities after any applicable adjustments. Where we include in TAC a life reserve adjustment, policyholder capital, or unrealized gains on investments backing participating life business, we typically adjust the reported liabilities to determine the relevant exposure measure. We may adjust the reported life liabilities where we determine they do not capture the relevant exposure measure for other life technical risks (e.g., longevity swaps). We exclude liabilities relating to long-term care and long-term health business with aging reserves from the exposure measure because the charges for these products separately capture the other life technical risks.

Pandemic Risk



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We apply capital charges to the NAR to capture potential mortality losses in a pandemic. This capital charge is in addition to our mortality charges and is designed to capture event risk. To

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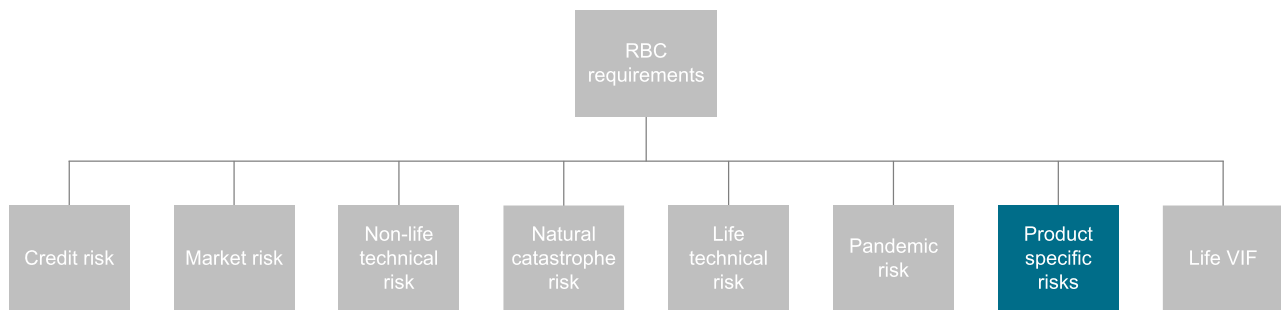
determine the capital charge, we assume 1.5 excess deaths per 1,000 of the insured population at the 99.5% confidence level. We apply this assumption to the same cohort of life insurers used to calibrate our mortality risk charges to determine the amount of excess claims payments. We compare this amount with the NAR and apply factors based on our assumption of a normal distribution to determine the capital charges at each confidence level (see table 29).

Table 29

Pandemic Risk Capital Charges

(%)	--Capital charges--			
	99.99%	99.95%	99.8%	99.5%
Net amount at risk	0.084	0.074	0.065	0.058

Product-Specific Capital Charges



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Variable annuities

We apply capital charges to capture the risks of writing variable annuity (VA) products. Where we determine VAs are material to an insurer's risk profile and the insurer calculates its reserves and regulatory capital requirements using stochastic modeling, we typically use the results of the stochastic modeling, calibrated to our stress scenarios, to determine the capital requirement for VAs. Where an insurer uses conditional tail expectation (CTE) to measure the risk associated with VAs, we use the following CTE levels for our four stress scenarios: 99.75%, 98.75%, 96.5%, and 92%.

Where companies write VAs with living benefit guarantees (usually via riders on top of the base VA policy), we expect the stochastic modeling to calculate the net present value (NPV) of incoming and outgoing cash flows in multiple scenarios that vary in multiple metrics, including:

- Type of rider benefits (such as guaranteed minimum withdrawal benefit and guaranteed minimum income benefit);

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- Equity and bond market returns;
- Interest rates;
- Policyholder behavior and mortality;
- Rider fee pricing;
- Hedging policies; and
- Hedging effectiveness.

Determining Variable Annuity Capital Requirements

To apply the results from the stochastic modeling, we expect the insurer to run two sets of scenarios to account for hedge effectiveness. The first is a best-effort set of scenarios that assume a fully functioning dynamic hedging program throughout the length of the simulation (which can be very long). The second set is an adjusted set of scenarios that are identical to the best-effort set except for the hedging. The second set assumes the insurer can make use of the hedging contracts and securities on its balance sheet at the start of the simulation but does not allow for future management actions.

The capital charge is the difference between the stressed NPV of cash flows (at the four different stress levels) and the reserves. The stressed NPVs for each stress level are the pretax values from the stochastic simulations. We blend the best-effort and adjusted runs to give up to 80% credit for hedging. For example, if we give 80% credit to hedging and use CTE values to determine stressed losses, the 99.99% charge is:

$$VA_{99.99} = \text{MAX}((0.80 * \text{best-effort@CTE}_{99.75} + 0.20 * \text{adjusted@CTE}_{99.75}) - \text{reserve}, 0)$$

We typically give 80% credit for hedging unless the insurer uses a lower value for regulatory capital purposes. In the U.S., for example, we expect insurers to provide their pretax CTE values for their best-effort and adjusted runs, their statutory reserve, and the E factor, which reflects the accuracy of their modeling. We use the E factor to determine the amount of hedge credit (e.g., if the E factor is 0.3, we typically give 70% hedge credit).

Capital charges for participating life business in ring-fenced funds

Where we determine participating life business is written in a ring-fenced fund within a legal entity, we typically exclude the related policyholder capital from TAC and exclude the related assets and liabilities from the inputs we use to determine the risk-category-specific capital requirements. Instead, we assess the residual risk posed by the ring-fenced participating life business to the insurer in stress scenarios.

We usually measure the residual risk as the amount of capital that the insurer may be required to provide to the ring-fenced fund in stress scenarios to ensure liabilities in the ring-fenced fund are met. For insurers that operate more than one ring-fenced fund, we make this assessment for each fund and sum the results at each confidence level.

We generally use regulatory definitions of ring-fenced funds to determine whether participating life business is written in a ring-fenced fund. In the absence of a regulatory definition, we may assess factors such as any relevant legal arrangements, contractual terms, and the organizational structure of an insurer to make our own determination of ring-fencing. Typically, the assets in a ring-fenced fund are restricted and the capital in the fund is available only to absorb losses in the fund.

Criteria Insurance General: Insurer Risk-Based Capital Adequacy--Methodology And Assumptions

To determine the residual risk to the insurer from participating life business in ring-fenced funds, we may use regulatory information on the capital adequacy of the fund or equivalent issuer information based on regulatory methodologies. Where we use regulatory information on the capital adequacy of the fund or issuer information based on regulatory methodologies, we expect the regulatory methodology to include the expected value of future discretionary benefits in technical reserves, to capture the value of options and guarantees, to be risk-based, and to be applied at the ring-fenced fund level. We also typically expect the methodology to allow for the impact of management actions in stress scenarios.

Alternatively, we may assess the fund's capital adequacy by comparing our assessment of TAC for the fund (including in this TAC the policyholder capital and up to 50% of the expected value of future discretionary benefits where this is included in regulatory capital) with capital requirements based on our standard risk charges.

The capital requirement for participating life business in ring-fenced funds is the total of any deficiency of capital resources in ring-fenced funds relative to capital requirements at each confidence level.

Where we use regulatory information on the capital adequacy of the fund or issuer information based on regulatory methodologies, we adjust the regulatory capital requirements to align the calibration with our confidence levels, assuming a log-normal distribution. Once we have determined the capital requirements at the 99.5% confidence level, we apply factors of 1.3x, 1.7x, and 2.2x to determine the capital requirements at the 99.8%, 99.95%, and 99.99% confidence levels, respectively. We assume that the ability to apply management actions and share losses with policyholders diminishes as the severity of the stress increases.

Where we determine participating life business in a ring-fenced fund is immaterial, we may include policyholder capital in TAC and include the related assets and liabilities in the inputs we use to determine the risk-category-specific capital requirements. We may also apply this consolidated approach where we determine a ring-fenced fund has insufficient capital resources in the fund relative to capital requirements at all confidence levels.

Long-term health business with aging reserves

We apply capital charges to the net aging reserves to capture the potential losses on long-term health insurance products from higher-than-expected morbidity inception rates and lower-than-expected claims termination rates in stress scenarios (see table 30). These unexpected losses could stem from volatility in the level of morbidity rates, volatility around the trend, misestimation of morbidity at policy inception, and lower-than-expected mortality. The capital charges also capture potential losses from lapse, expense, and operational risks.

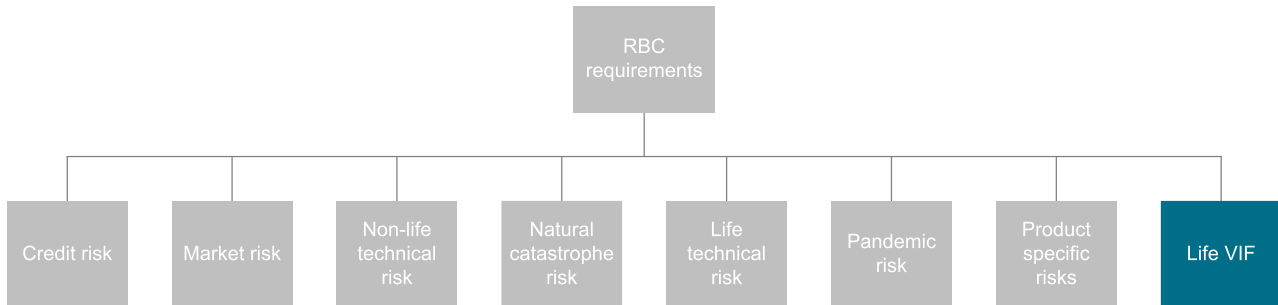
To develop the capital charges, we applied analytical judgment informed by regulatory calibrations and industry data. We implicitly capture in the capital charges the significant risk-mitigating benefits of the premium adjustment mechanism and diversification within life technical risks. We assume a log-normal distribution to determine the charges at each confidence level.

Table 30

Long-Term Health Business With Aging Reserves Capital Charges

(%)	--Capital charges--			
	99.99%	99.95%	99.8%	99.5%
Net aging reserves	4.1	3.5	3.0	2.5

Life Value-In-Force Capital Charge



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We apply capital charges to posttax VIF to capture the potential change in VIF in stress scenarios. The capital requirement is a measure of the potential reduction in the present value of future profits in each of the four stress scenarios.

To determine the capital charges, we primarily analyzed embedded value securitizations to assess advance rates at different stress levels. We also applied analytical judgment, as well as rounding and scaling factors consistent with the general calibration of our capital charges.

We apply the capital charges in table 31 to the elements of VIF that we include in TAC. This includes on- and off-balance-sheet VIF, including the value of life business acquired (or purchased life VIF) and life DAC.

Table 31

Life Value-In-Force Capital Charges

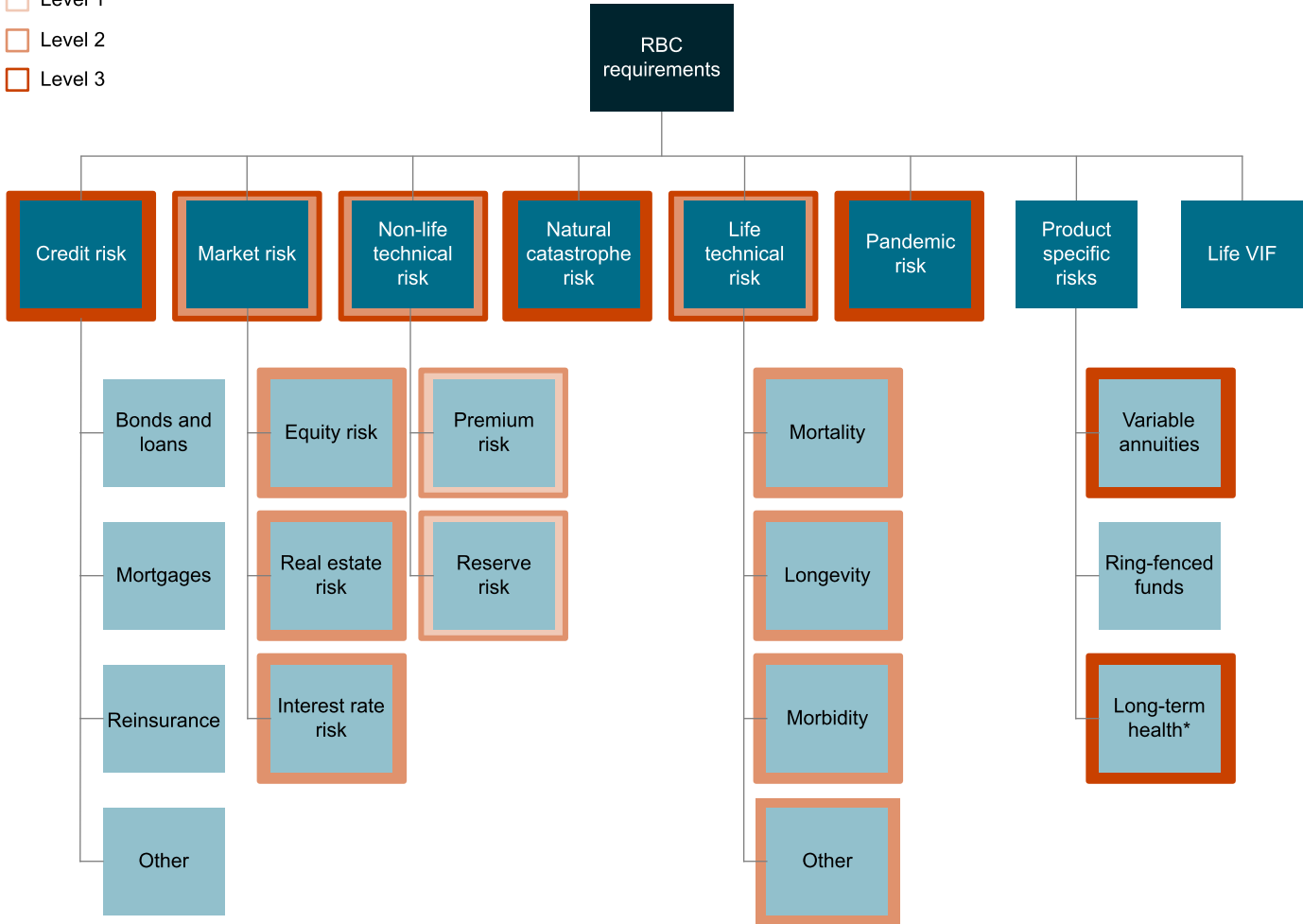
(%)	--Capital charges--			
	99.99%	99.95%	99.8%	99.5%
Value of in-force life business	65	55	45	35

If the elements of VIF that we include in TAC total less than zero, the life VIF capital charge is zero.

SECTION 4: DIVERSIFICATION

Diversification: levels 1-3

- Level 1
- Level 2
- Level 3



*Long-term health business with aging reserves. Source: S&P Global Ratings.
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To determine the total RBC requirements, we assess risk dependencies using correlation assumptions between various risk pairings. This explicit diversification credit brings the sum of the capital requirements across each risk to a level commensurate with the defined stress scenarios. We apply correlation assumptions at three levels:

- Level 1 diversification: Within business lines
- Level 2 diversification: Within risk categories
- Level 3 diversification: Between risk categories

To determine the correlation assumptions, we analyzed correlations between risk pairings based on various data sources. The assumptions reflect a combination of our statistical analysis and analytical judgment informed by the assumptions used in different regulatory frameworks. We use a variance-covariance approach that assumes linear correlations.

In setting our assumptions, we assume a diversified risk profile with no significant

concentrations--for example, with respect to correlated sector exposures in assets and liabilities. We do not apply correlation assumptions to capture geographic diversification in the capital model. We apply the same correlation assumptions for all confidence levels but apply haircuts to the absolute amount of diversification at the substantial, severe, and extreme stress scenarios of 10%, 20%, and 30%, respectively. These haircuts reflect our view of uncertainties around tail correlations.

Level 1 Diversification

We apply the correlation assumptions in table 32 to capture diversification between non-life premium risk and reserve risk. We group all lines of business on a global basis into seven broad product categories:

- Liability;
- Property;
- Motor;
- Financial;
- Health;
- Marine, aviation, and transport (MAT); and
- Other.

We include mortgage insurance in the financial product category.

We apply the correlation assumptions to the non-life premium and reserve risk capital requirements for each of the seven product categories to determine the diversified capital requirements within each business line (i.e., the sum of premium and reserve risk after diversification).

Table 32

Non-Life Premium And Reserve Correlation Assumptions At Line Of Business Level

(%)	Premium	Reserve
Premium	100	75
Reserve	75	100

Level 2 Diversification

We apply the correlation assumptions in tables 33-35 to capture product or risk type diversification within the following risk categories:

- Non-life technical risk;
- Life technical risk; and
- Market risk.

We apply the assumptions in table 33 to the diversified capital requirements determined in level 1 for the seven product categories to determine the diversified non-life technical risk capital

requirements.

Table 33

Non-Life Technical Risk Correlation Assumptions

(%)	Liability	Property	Motor	Financial	Health	MAT	Other
Liability	100	50	50	25	50	50	50
Property	50	100	75	25	50	50	50
Motor	50	75	100	25	50	50	50
Financial	25	25	25	100	25	25	50
Health	50	50	50	25	100	50	50
MAT	50	50	50	25	50	100	50
Other	50	50	50	50	50	50	100

MAT--Marine, aviation, transport.

We apply the correlation assumptions in table 34 to the capital requirements for mortality, morbidity, longevity, and other life technical risks. We then add this total to the capital requirements for long-term health business with aging reserves and variable annuities to determine the diversified life technical risk capital requirements.

Table 34

Life Technical Risk Correlation Assumptions

(%)	Mortality	Morbidity	Longevity	Other life	Pandemic*
Mortality	100	50	(25)	25	25
Morbidity	50	100	25	25	50
Longevity	(25)	25	100	25	0
Other life	25	25	25	100	25
Pandemic*	25	50	0	25	100

*Used only to calculate the implied correlation between pandemic and life technical risk capital requirements as applied in table 36.

We apply the correlation assumptions in table 35 to the capital requirements for equity, real estate, and interest rate risk to determine the diversified market risk capital requirements.

Table 35

Market Risk Correlation Assumptions

(%)	Equity	Real estate	Interest rate
Equity	100	75	50
Real estate	75	100	50
Interest rate	50	50	100

Level 3 Diversification

We apply the correlation assumptions in table 36 to capture diversification between risk categories. We apply the assumptions to the capital requirements for credit, natural catastrophe, and pandemic risks (including contingent reinsurance credit risk for both catastrophe and pandemic) and the diversified capital requirements determined in level 2 for market, non-life technical, and life technical risks.

We then add this total to the capital requirements for ring-fenced life funds, life VIF, and other assets to determine diversified capital requirements. We also make the following adjustments to determine total diversified capital requirements:

- We do not give diversification credit for financial lines against credit and market risks.
- We do not give diversification credit for variable annuities against credit and market risks.

Table 36

Correlation Assumptions Between Risk Categories

(%)	Market	Credit	Natural catastrophe§	Non-life technical	Life technical	Pandemic§
Market	100	75	25	25	25	75
Credit	75	100	25	25	25	75
Natural catastrophe§	25	25	100	0	0	0
Non-life technical	25	25	0	100	0	25
Life technical	25	25	0	0	100	N/A*
Pandemic§	75	75	0	25	N/A*	100

*We calculate the implied correlation (IC) between pandemic and life technical risk capital requirement based on the diversified life technical risk capital requirements including pandemic risk. This is calculated by applying the correlation assumptions in table 34 to the capital requirements for mortality, morbidity, longevity, other life technical, and pandemic risks and adding the capital requirements for long-term health business with aging reserves and variable annuities. §Natural catastrophe and pandemic risks are inclusive of contingent reinsurance counterparty risk.

SECTION 5: APPENDIXES

I. Glossary

Term	Definition
Adjusted non-life net loss reserves	Reported net loss reserves plus or minus related non-life reserve adjustments made in TAC. We assume the adjustment applies proportionally across all lines of business in all countries and regions and exclude adjustments made in TAC related to premium provisions.
Affiliate	An entity that is either a subsidiary or an associate.

Criteria Insurance General: Insurer Risk-Based Capital Adequacy--Methodology And Assumptions

Term	Definition
Aggregate exceedance probability (AEP) curve	Output from a model that details losses from multiple events and the related attachment probability.
Associate	An entity over which the group parent has significant influence but not control.
Disability product definitions:	
Noncancelable disability income	An individual policy designed to compensate insured individuals for a portion of the income they lose because of a (partial) disabling injury or illness. Benefits are usually paid out as an annuity (monthly or weekly income benefit) and not as a lump sum. There is a fixed end date for the annuity payments in the contract. The policy premiums cannot be changed by the insurer.
Other individual income	Individual policies that provide a weekly or monthly income benefit for up to two years for full or partial disability arising from an accident and/or sickness. Policies other than noncancelable are included in this category.
Group long term	Policies offered through employers or organizations that provide a weekly or monthly income benefit for more than one year for full or partial disability arising from accident and/or sickness.
Group short term	Policies provided through employers or organizations that provide a weekly or monthly income benefit for up to one year for full or partial disability arising from accident and/or sickness.
Credit monthly outstanding balance	Covers the monthly loan or credit payments to the creditor upon the disablement of an insured debtor. Monthly premiums are paid based on the balance of the debt amount.
Credit single premium	Covers the monthly loan or credit payments to the creditor upon the disablement of an insured debtor. A single premium is added to the initial debt balance.
Other disability income	Policies that do not fit into the other categories.
Eligible infrastructure equities	Equity exposures to infrastructure assets that are i) in the operational phase; ii) regulated or contractually protected so that they generate predictable operational cash flows; and iii) part of a diverse infrastructure equity portfolio.
Occurrence exceedance probability (OEP) curve	Output from a model that details losses from individual events and the related attachment probability.
Other equity-like reserves	Other equity-like reserves include the following: Contractual service margin (IFRS 17); Risk adjustment (IFRS 17); Excess XXX/AXXX reserves (U.S. statutory); Provision for adverse deviations (PfADs); Excess liability reserves (Japanese GAAP); Equalization reserves; Catastrophe reserves; Contingency reserves; Asset valuation reserves (U.S. statutory); and Interest maintenance reserves (U.S. statutory).
Regulated operating entities	Entities that are subject to prudential regulation that includes an assessment of the adequacy of their capitalization. We generally regard banks and insurers as entities that are subject to prudential regulation.
Subsidiary	An entity that we determine is controlled by the group parent. Control may be present even if the group owns less than 50% of the entity.

II. Market Variables

Overview And Scope

Here S&P Global Ratings provides additional information on the market variables derived from the application of these criteria and used in determining capital requirements. We will periodically update these variables as market conditions warrant.

Market Variables

Credit risk recovery categories

Table 37 lists the typical assets that we include in each recovery category. We use these categories to determine the credit risk capital requirements for bonds and loans in tables 3-6 (for example, we apply table 3 for assets in category 1).

Table 37

Credit Risk Recovery Categories

Category	Typical assets
Category 1	Sovereign, local and regional governments (LRGs), and U.S. municipal debt (including multilateral lending institutions)
	Government-related entities (GREs) with an almost certain likelihood of extraordinary government support where we equalize the rating with the relevant sovereign
	Senior secured bonds and loans (corporates, financials, and non-LRG public-sector obligors)
	Infrastructure corporates and project finance (other than subordinated exposures)
	Covered bonds
Category 2	Senior unsecured bonds and loans (corporates, financials, and non-LRG public-sector obligors)
Category 3	Subordinated bonds and loans and preferred stock (corporates, financials, non-LRG public-sector obligors, and infrastructure)
Category 4	Structured finance, including non-agency RMBS, non-agency CMBS, CLO, CDO, ABS, agency RMBS, and agency CMBS

Rating input assumptions by sector and economic risk group

We use the rating input assumptions by sector and economic risk group in table 38 for step 4 in chart 4.

Table 38

Rating Input Assumptions By Sector And Economic Risk Group For Step 4

Sector	--Economic risk group--									
	1	2	3	4	5	6	7	8	9	10
Sovereign/public finance	A	A	A	A	BBB	BBB	BB	B	B	CCC
Financials	BBB	BBB	BBB	BBB	BBB	BB	BB	B	B	CCC

Table 38

Rating Input Assumptions By Sector And Economic Risk Group For Step 4 (cont.)

Sector	--Economic risk group--									
	1	2	3	4	5	6	7	8	9	10
Nonfinancial corporates	BB	BB	BB	BB	BB	BB	BB	B	B	CCC
Structured finance - senior*	BBB	BBB	BBB	BBB	BBB	BBB	BB	B	B	CCC
Structured finance - mezzanine§	BB	BB	BB	BB	BB	BB	B	CCC	CCC	CCC
Structured finance - junior†	CCC	CCC	CCC	CCC	CCC	CCC	CCC	CCC	CCC	CCC

Notes: We use these portfolio-level credit quality assumptions solely for the purpose of determining the rating input to apply capital charges. See the sector definitions below. *Includes the seniormost tranche of a securitization. §Includes all tranches between the senior and junior tranches. †Includes the juniormost debt tranche of a securitization (and any equity tranche). We typically include all tranches of resecuritizations, such as CLO combo notes, in this category.

We use the following sector definitions:

Sovereigns and public finance. This sector includes sovereign governments, international public finance (IPF), and U.S. public finance (USPF). The IPF sector includes local and regional governments (LRGs), such as states, provinces, regions, cities, towns, or oblasts, and non-LRGs, such as non-U.S. universities, hospital systems, transportation systems, and housing providers. USPF includes state government general obligations, local government, utilities, housing, higher education, health care, transportation, and charter schools.

Financials. This sector includes banks, nonbank financial institutions (NBFIs), and insurers. Banks includes savings and loans and credit unions. NBFIs include broker-dealers, asset managers, finance companies, financial market infrastructure companies, and other financial entities that share some common features. Insurers includes life insurers, health insurers, non-life insurers, reinsurers, bond insurers, mortgage insurers, and title insurers. We also include covered bonds in financials.

Nonfinancial corporate. This sector includes aerospace/automotive/capital goods/metals, consumer/service, energy and natural resources, forest and building products/homebuilders, health care/chemicals, high technology/computers/office equipment, leisure time/media, real estate, telecommunications, transportation, and utilities. We also include infrastructure (both corporate and project finance).

Structured finance. This sector includes residential mortgage-backed securities (RMBS), commercial mortgage-backed securities (CMBS), asset backed securities (ABS), structured credit, and single-name synthetics. RMBS includes transactions backed by subprime mortgage loans, as well as home equity loan transactions and real estate mortgage investment conduits (re-REMICS). CMBS also includes re-REMICS, as well as some collateralized debt obligations (CDOs) primarily collateralized by commercial real estate loans. ABS includes underlying collateral types such as credit card receivables, student loans, auto loans and leases, manufactured housing, franchise loans, 12b-1 transactions, and corporate securitizations. Structured credit includes collateralized loan obligations, both cash and synthetic CDOs backed by exposures to corporate credit or other structured finance securities, and market-value CDOs and other leveraged funds. We also include transactions backed by loans to small and midsize enterprises in the structured credit sector. Single-name synthetic transactions are also referred to as repackaged transactions (or "repacks"), especially in Europe. The definition of a repack in this instance is an issue backed by a

single credit, where the rating on the note is directly linked to that on the underlying credit.

Equity market groups by country

We use the allocation of countries by equity market group in table 39 for the purposes of determining the equity risk capital requirements (see table 14).

Table 39

Equity Market Groups By Country

Equity market group	Countries
1	Switzerland, U.K., U.S.
2	Australia, Austria, Belgium, Canada, Chile, Colombia, Denmark, France, Germany, Hong Kong, Israel, Italy, Japan, Mexico, Netherlands, New Zealand, Norway, Portugal, Singapore, South Korea, Spain, Sweden
3	Bahrain, Brazil, China, Czech Republic, Finland, Hungary, India, Ireland, Kuwait, Latvia, Lithuania, Luxembourg, Malaysia, Malta, Poland, Qatar, Saudi Arabia, Slovakia, Slovenia, South Africa, Taiwan, Turkey, UAE
4	Other world
Infrastructure - category 1*	Australia, Canada, Chile, EU, Hong Kong, Israel, Japan, Malaysia, New Zealand, Norway, Switzerland, Singapore, South Korea, Taiwan, U.K., U.S.
Infrastructure - category 2*	Other world

*Eligible infrastructure equities (see glossary).

Real estate groups by country

We use the allocation of countries by real estate group in table 40 for the purposes of determining the real estate risk capital requirements (see table 15).

Table 40

Real Estate Groups By Country

Real estate group	Countries
1	Germany, Japan, Switzerland
2	Australia, New Zealand, Taiwan, other Europe
3	Canada, China, U.S.
4	Spain, U.K., other world

Interest rate risk categories by country

We use the allocation of countries by interest rate risk category in table 41 for the purposes of determining the relevant yield stress assumption for each currency (see table 16).

Table 41

Yield Stress Categories By Country

Category	Countries
Category 1	Japan
Category 2	N/A*
Category 3	Canada, China, Hong Kong, Norway, Singapore, Sweden, Switzerland, Taiwan
Category 4	Australia, Chile, Czech Republic, Denmark, Eurozone, GCC states, India, Israel, Malaysia, Mexico, New Zealand, South Africa, South Korea, Thailand, U.K., U.S.
Category 5	Brazil, Colombia, Kazakhstan, Poland, Russia

Notes: For any country not listed, we typically use the sovereign foreign currency rating to determine the relevant category. If the sovereign foreign currency rating is 'BBB-' or higher, we typically include the country in category 4. If the sovereign foreign currency rating is 'BB+' or lower (or unrated), we typically include the country in category 5. *No countries are currently assigned to this category.

Duration mismatch assumption grouping by country (life insurers)

For life insurers, we use the allocation of countries by duration mismatch group in table 42 for the purposes of determining the relevant duration mismatch assumption for each country (see table 17).

Table 42

Duration Mismatch Assumption Groups By Country (Life)

Group	Countries
Group A*	Australia, Canada, New Zealand, Portugal, Spain, U.K., U.S.
Group B	Belgium, France, Italy, Kazakhstan, South Africa, Switzerland
Group C	Czech Republic, Gulf Cooperation Council states, Hong Kong, Mexico, Netherlands, Singapore
Group D	Austria, Brazil, Chile, Colombia, Germany, Israel, Malaysia, Nordics, Poland, Slovenia
Group E	Japan, South Korea, Taiwan
Group F§	China, India, Thailand

Note: Any country not listed is typically included in group F. *We include long-term health business with aging reserves and unit-linked products with investment guarantees in group A. §We include U.S. long-term care in group F.

Natural catastrophe risk: industry average catastrophe loss and expense ratios

For the purposes of determining the catastrophe-related premium under steps 1 and 2, we use an industry average catastrophe loss ratio of 50% and an industry average expense ratio of 30%.

Mortality/morbidity risk: highly developed life markets

For the purposes of determining capital requirements for mortality and morbidity risk, we define highly developed life markets as: Australia, Austria, Belgium, Canada, Chile, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Hong Kong, Hungary, Ireland, Israel, Italy,

Japan, Liechtenstein, Luxembourg, Macao, Malta, the Netherlands, New Zealand, Norway, Poland, Portugal, Singapore, Slovakia, Slovenia, South Korea, Spain, Sweden, Switzerland, Taiwan, the U.K., and the U.S. We define the life insurance market in all other countries as less developed.

REVISIONS AND UPDATES

This criteria article was originally published on Nov. 15, 2023.

Changes introduced after original publication:

- On Jan. 22, 2025, we republished this criteria article to make nonmaterial changes. We updated the contact information and "Related Publications" section, and we deleted the sections "Retired Guidance," "Related Guidance," "Related Sector and Industry Variables Reports," and "Fully Superseded Criteria," which were no longer relevant. We also deleted the sections "Key Publication Information," "Changes From Previous Criteria," and "Impact On Outstanding Ratings," which were related to the initial publication of the criteria and no longer relevant.

RELATED PUBLICATIONS

Related Criteria

- Methodology And Assumptions For Analyzing Bond Insurance Capital Adequacy, July 26, 2024
- Methodology For Determining Ratings-Based Inputs, July 26, 2024
- Hybrid Capital: Methodology And Assumptions, March 2, 2022
- Banking Industry Country Risk Assessment Methodology And Assumptions, Dec. 9, 2021
- Group Rating Methodology, July 1, 2019
- Insurers Rating Methodology, July 1, 2019
- Principles Of Credit Ratings, Feb. 16, 2011

Other Related Publications

- Banking Industry Country Risk Assessment Update (updated monthly and available on CapIQ and spglobal.com)
- Human Mortality Database (University of California, Berkeley), <https://www.mortality.org>
- Max Planck Institute for Demographic Research (Germany), <https://www.humanmortality.de>

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